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NOVEMBER 16, 1998 VOLUME 15, NUMBER 46

NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

Routers hit with third batch of bugs.
Page 6.

# DISPATCHES FROM THE HACKER WARS

**SPECIAL REPORT:** Network break-ins

**By Ellen Messmer**

Most IS professionals don't want to talk about the times they've been hacked. Some fear it gives their competitors, or other hackers, insight into their network. Others don't want to give hackers the attention they so desperately seek. And some are simply embarrassed.

After dozens of requests, we found five people willing to tell us what it is like when the hackers start sneaking in.

### No longer a game

As a teenage hacker, Manny Berrios loved to break into organizations' networks out of a passion for adventure. But now, in his mid-20s and vice president of IT at a growing Web-based game service called ActionWorld, hackers have become his round-the-clock headache.

Network security logs tell Berrios that hackers are constantly probing for holes in ActionWorld's Web servers, which are based on Microsoft's Internet Information Server 4.0. They also enjoy shooting down his server farm, housed in New York, with denial-of-service attacks in the middle of the night; these immediately set off Berrios' beeper. Ironically, these hackers are often ActionWorld's own online game customers — all part of the youthful crowd that lives and plays on the 'Net. And if they discover your network's vulnerabilities, they'll trash everything they can.

*See* Hackers, *page 90*

# Flat-rate T-1 lines hitting the street

**By David Rohde**

One of the most nettlesome WAN planning problems — contending with costly and unpredictable T-1 access prices — is beginning to lose its sting.

AT&T and MCI WorldCom last week told *Network World* that they are now offering regional and national flat-rate T-1 access on a case-by-case basis. The flat-rate plans — which consultants say cost as little as $300 per month per line for big users — are a radical departure from the age-old method of pricing local dedicated access from the customer premise to long-distance carriers' points of presence (POP).

For most users, the Big Three carriers still purchase T-1s from local carriers and pass along the charges, resulting in rates that vary wildly by state, city and often even local

*See* Flat-rate, *page 92*

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# IBM's XML giveaway

*Seeking to boost market, Big Blue releases nine new free tools.*

**By Robin Schreier Hohman**
*Armonk, N.Y.*

IBM is about to throw its considerable weight squarely behind Extensible Markup Language, and the company hopes to link its name with this emerging Web data definition technology as inextricably as Sun is associated with Java.

As part of the initiative, IBM is releasing for free nine XML development tools and applications that, among other things, use Java to create an XML visual editor, convert data to JavaBean classes, and convert XML to a printable format. While the initiative is aimed largely at developers, IBM's push could help bring XML more quickly to the forefront by driving the production of XML-compatible applications.

IBM is also launching a new dedicated Web site today, complete with online courses, papers, standards and sample XML code that could spur development of XML applications and the acceptance of the technology.

XML provides a way to reuse data from one application in

*See* XML, *page 87*

# Novell mail server aims for heart of the 'Net

**By Paul McNamara**
*Orem, Utah*

Intent on making an Internet splash, Novell will soon woo ISPs with a standards-based messaging server built to exploit what many see as the company's golden goose: Novell Directory Services (NDS).

The new offering — code-named Liberty — will revitalize and retool technology used in Netscape Messaging Server for NetWare, which Netscape and Novell had unsuccessfully pitched to enterprise cus-

*See* Novell, *page 88*

**More Novell news**

- Nortel pledges allegiance to NDS. Page 12.
- Novell gives middleware market a whirl. Page 12.

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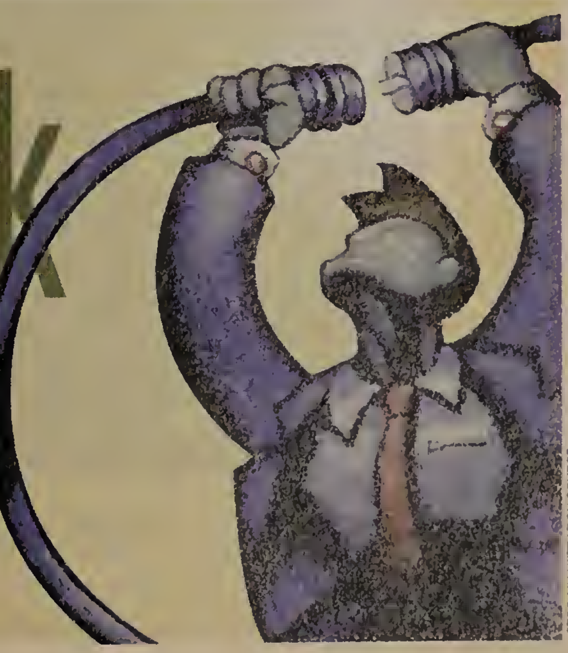
**SPECIAL SECTION:**

## DSL Outlook



**Can't get enough:** Early implementers tout DSL's easy installation and attractive pricing — when they can get the service. Page 55.

**DSL — the next generation:** We tested Paradyne's Hotwire MVL hardware in the field under real-world conditions (page 59) and in the lab (page 60).

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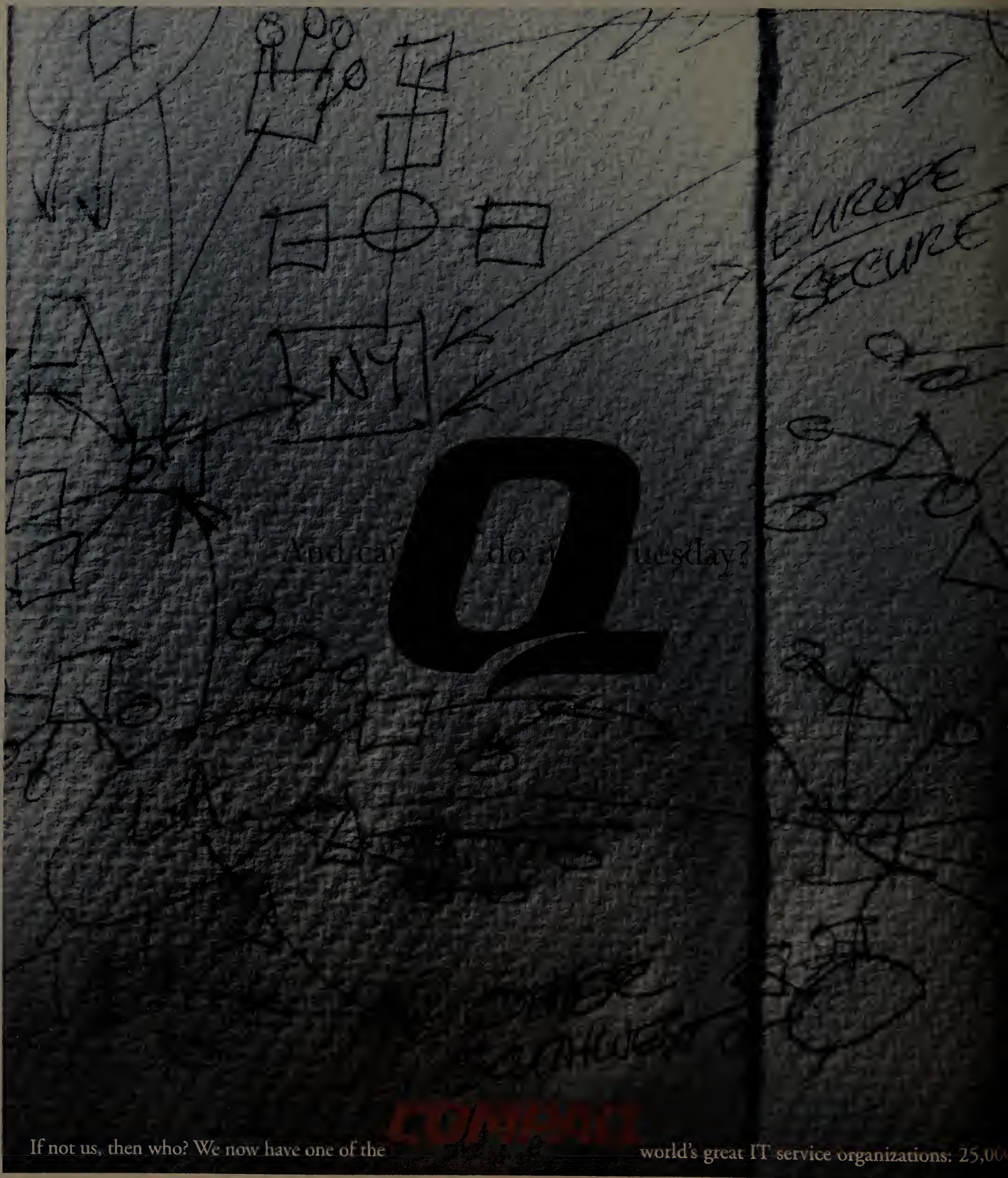

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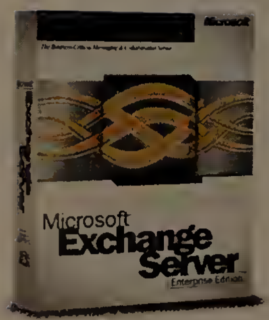

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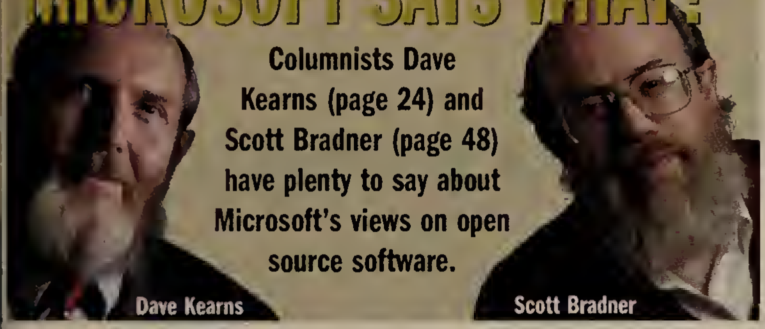
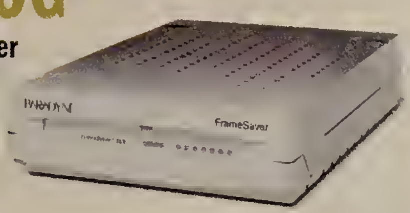
## MICROSOFT SAYS WHAT?



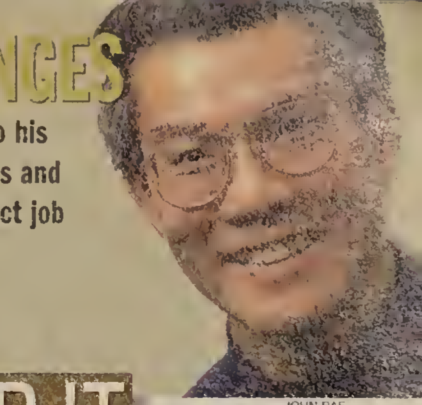
Columnists Dave Kearns (page 24) and Scott Bradner (page 48) have plenty to say about Microsoft's views on open source software.

## FRAME RELAY WATCHDOG



Paradyne's FrameSaver offering helps users keep an eye on their frame relay service providers. Page 33.

## TITLE CHANGES



JOHN RAE

Hien Nguyen added Java to his repertoire of network skills and landed an Internet architect job with AT&T. Page 67.

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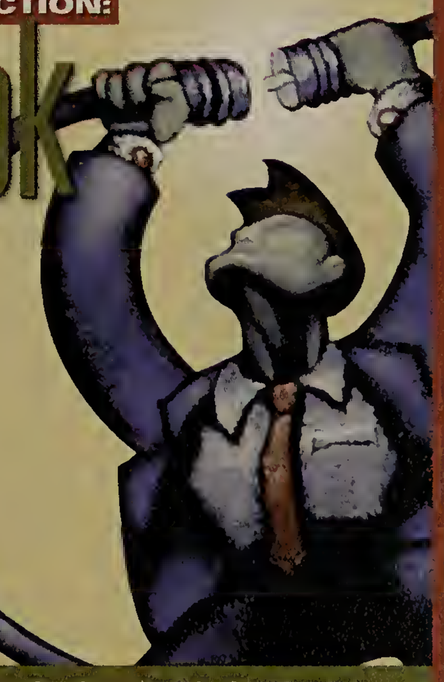
## DSL Outlook



**Can't get enough DSL:** Early implementers tout the benefits of DSL — when they can get it. Page 55.

**DSL in the real word:** A field test of Paradyne's MVL, a new flavor of DSL. Page 59.

**Performance under pressure:** A lab test of MVL, for the best-case scenario. Page 60.

## FACE-OFF

Linux vs. NT – Which is better for the enterprise? Red Hat's Bob Young takes on Microsoft's Ed Muth in a battle that starts in print but continues online (www.nwfusion.com). Page 53.

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### This Week

### Only on Fusion

**NOSes.** There's plenty of room ringside for our Fusion Face-Off slugfest pitting Linux and NT. Join Bob Young, CEO of Linux vendor Red Hat and Ed Muth, group product manager for Microsoft's Enterprise Marketing Group, in a week-long debate on the enterprise merits of their respective operating systems. **DocFinder: 9265**

**Gigabit Ethernet.** Or if you're interest is lower down the network stack, come down to our weekly Spotlight forum, which this week focuses on migrating to Gigabit Ethernet. Tony Lee, chairman of the Ethernet Alliance, is online to answer your Gigabit questions. **DocFinder: 9268**

**Caching.** Get up to speed on network caching? With our caching NetResources page, which will link you to primers and information on specific caching applications. **DocFinder: 9273**

### HOW TO GET ONTO NETWORK WORLD FUSION

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## News briefs, November 16, 1998

### Magaziner on the way out

**Magaziner** *played key role in IP address discussions.*

Ira Magaziner, the Clinton administration's top Internet adviser, last week announced he would be stepping down from his post by year-end. He did not reveal what he plans to do next

Magaziner, an adviser to Clinton for more than five years, has been instrumental in moving the management of the Internet from the public to private sector. However, the process by which Internet names and numbers are allocated has not been finalized. Board members of the nonprofit corporation for overseeing IP address and number allocation that Magaziner helped to create met last week in Boston to work on the company's bylaws. Magaziner has also been involved in the online privacy and Internet tax debates.

### Coming to your cell phone: the Internet

Perhaps it's the group's catchy name — the WAP Forum — that has vendors tripping over each other to become members. In any event, the Wireless Application Protocol (WAP) Forum now says its membership has swelled to 71 companies, all interested in developing a wireless Internet standard.

Firms such as Bell Atlantic Mobile, France Telecom, Acer Peripherals, Unisys and Sony have recently joined the group, which is developing a Wireless Markup Language that maps to HTTP. WAP is also defining a presentation model that will work on user interfaces for numerous wireless terminals, even mobile phones.

WAP was founded by mobile-device manufacturers Ericsson, Nokia and Motorola, plus wireless software provider Unwired Planet.

### Filtering out the bad stuff

The U.S Anti-Defamation League (ADL) last week released filtering software called HateFilter, aimed at keeping what the organization deems anti-Semitic, racist and extremist Web sites away from Netizens. The social rights group plans to sell the software to interested parties via its Web site at www.adl.org. Some of the sites the group finds offensive are those giving information about the White Aryan Resistance, the Ku Klux Klan and Holocaust deniers, ADL says. HateFilter is based on filtering technology from The Learning Company called CyberPatrol. The software costs $29.95.

### United we network

The U.S. government is pushing ahead with its Next Generation Internet (NGI) project, an effort to develop networks that will run 100 to 1,000 times faster than the current Internet. These networks will serve as test beds for new applications, said several government officials last week during a panel at the Supercomputing 98 show.

The NGI program kicked off in October 1997 and last month received $110 million from Congress for continued research. Also last month, President Clinton signed into law the NGI Research Act, designed to facilitate the group's activities. More information about the NGI program can be found at www.ngi.gov or at www.ccic.gov.

### Get on the new bus

Intel last week previewed the Next Generation I/O (NGIO) specification, which describes a technology for moving information within high-performance servers. The NGIO design calls for a channel-based, high-speed serial bus that builds on the Virtual Interface Architecture.

NGIO is supported by Dell, EMC, Hewlett-Packard, Mylex, Sun Microsystems and other companies.

# More bugs bite Cisco routers

*7XXX series, used in large enterprises and ISPs, vulnerable to leaky ACLs.*

**By Jim Duffy**
*San Jose*

More bugs have cropped up in Cisco Systems' routing software, affecting the security of the company's 7XXX series of routers, which are prevalent in large enterprises and ISP networks.

Certain versions of Cisco IOS software can cause IP datagrams to be output to network interfaces even though access control lists (ACL) have been applied to filter those datagrams, according to a field notice on Cisco's Web site. These vulnerabilities may permit users to obtain unauthorized access or make other attacks on computer systems or data, the Cisco field notice states.

The bugs apply to routers equipped with Cisco versatile interface processors (VIP) and configured for distributed fast switching (DFS). Cisco says it does not know of any incidents in which these vulnerabilities have actually been exploited by attackers.

DFS uses multiple route caches to expedite packet switching through a router.

There are two independent vulnerabilities, and each affects only a specialized subset of DFS configurations. The first is a defect in the 11.1CC and 11.1CT releases of Cisco IOS.

The bug affects all 75XX and 72XX series routers, as well as 70XX routers with Route-Switch Processor cards. If the routers are configured to switch traffic from an interface with DFS enabled to an interface that has not been DFS-enabled, they are susceptible to the ACL bug. DFS-to-non-DFS configurations are common to routers that contain both VIP and non-VIP interface cards.

The second bug affects 11.1, 11.2 and 11.3 versions of Cisco IOS software on the Cisco 70XX and 75XX series routers. To be vulnerable, the routers must be configured to switch traffic from a DFS-enabled input interface to a logical subinterface of a physical output port. The output interface may or may not have DFS enabled.

Subinterfaces are associated with subsets of the traffic on physical interfaces. For instance, a physical frame relay interface might have a subinterface associated with each frame relay permanent virtual circuit.

The bug causes the ACL applied to one subinterface to be incorrectly used on traffic for other subinterfaces.

Neither of the defects "fails reliably," Cisco says, meaning the same ACLs on the same interfaces may work correctly at some times but fail at others. Because of this, administrators who test their ACLs may be misled that the lists are providing effective protection, when in fact they are not, the field notice states.

**Cisco routers** *are under attack by bugs for at least the third time.*

Disabling DFS eradicates the bugs, according to Cisco and Cisco users.

"We don't run distributed fast switching," says Michael Sjolander, manager of network LAN services at USAA in San Antonio. The Cisco field notice also indicates which commands and configurations are not affected by the bugs. USAA's network complies with these commands, Sjolander says.

"We do not have the IP route cache distributed," says Chuck Ganguss, director of data networks at American Stores in Dublin, Calif. "If that's the case, we're not affected by either vulnerability."

"Since there is a workaround, I personally do not think that this is that big a deal," says Allen Robel, senior net analyst for the computer services department at Indiana University in Bloomington. "And since most companies use a firewall, or access-lists on a firewall router, the fix would not necessarily involve reconfiguring a lot of routers."

Disabling DFS, though, could overload the router's primary CPU, Cisco says. That's because the purpose of DFS is to transfer computational load from the router's primary CPU to the CPUs on the VIP cards.

Users may also be able to work around the first bug by enabling DFS on all interfaces. The second bug can "sometimes" be bypassed by using the same output ACL on all the subinterfaces of a physical interface, the Cisco notice states.

Another possible workaround is for users to redesign ACLs to avoid the need for output access lists on affected interfaces, the company says.

Cisco is also offering free software updates to correct these defects for all vulnerable customers, regardless of software maintenance contract status.

This is at least the third time that bug problems have cropped up in Cisco IOS router software. Last summer, a bug allowed attackers to crash remote routers (*NW*, Aug. 24, page 1). And last month, a defect allowed users to gain access to network passwords. ■

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This week's question:

**What e-mail technology is Mark Crispin credited with inventing?**

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## THE MICROSOFT DIARIES

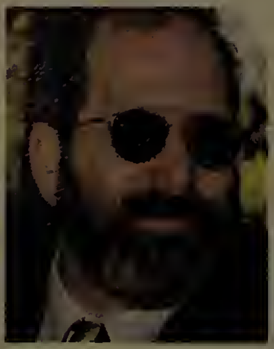
Week four

*The Microsoft-DOJ Trial*

### MONDAY, NOV. 9

Bill and Co. today learned their closest industry ally may be the government's most damaging witness.

The government showed several video clips of Bill Gates denying he knew about his Wintel partner's intention to build Internet software. But those denials fly in the face of testimony from Intel Vice President Steven McGeady, who said Gates was at one meeting in which Intel's Internet software plans were discussed.


**Intel's McGeady:** *Thorn in Gates' side.*

"Gates was very upset that we were making investments in software," McGeady said of an Aug. 2, 1995 meeting. Also introduced in court today was an internal Intel memo from Senior Vice President Ron Whittier, who reported that Gates basically said Intel should use its software resources to "do something useless that would not interfere with Microsoft."

McGeady added that Gates "felt that what we did in software directly competed with Microsoft . . . and Bill made it very clear that Microsoft would not support our next processor if we did not get alignment on other issues. The threat was both credible and fairly terrifying."

### TUESDAY, NOV. 10

McGeady continued his testimony today, saying a Microsoft official told Intel that Microsoft "owned software to the metal." "Microsoft felt it had control of all the software above the hardware," he said.

McGeady explained Intel had been trying to develop device drivers that would run independently of the operating system. "They told us we had no business writing software at that level," he said.

When Microsoft lawyer Steven Holley finally got his shot at McGeady, he took him down a path of questioning that dodged the sweet spots in the government's case. He focused on a dry debate over why Intel abandoned its work on technology dubbed native signal processing software, which was supposed to speed up the delivery of multimedia applications.

### WEDNESDAY, NOV. 11

Court recessed in recognition of Veterans Day.

### THURSDAY, NOV. 12

Microsoft lawyers today livened up cross-examination of Intel's McGeady, painting him as a "prima donna" and a disgruntled employee who saw Microsoft as "Satan" and leaked stories to the press. Microsoft's Holley accused McGeady of making things up and exaggerating facts. But the accusations didn't shake McGeady's steady demeanor.

Microsoft concluded its cross-examination of McGeady early this afternoon, leaving lead government attorney David Boies to attempt to undo any damage wrought by Holley.

Boies used internal Intel and Microsoft documents to attack Holley's allegation that McGeady added the word "extinguished" to his account of Microsoft's plan to "extend, embrace and extinguish" competitors on the Internet.

McGeady's boss, Whittier, in his deposition said he had also heard a Microsoft official say "embrace and smother."

"It was interpreted internally that Microsoft would do what it has to do to win the browser wars," Whittier said.

*— Christine Burns*

# Compatible's monster VPN box

*Support for 40,000 sessions is eight times that of closest competitor.*

**By Tim Greene**
*Boulder, Colo.*

Compatible Systems has bulked up its Internet virtual private network (VPN) box to make it more attractive to service providers, but enterprise managers say they are interested in the high-capacity box as well.

The new IntraPort Enterprise-8 supports up to 40,000 simultaneous connections between remote users and corporate LANs, well beyond the needs of most corporations.

But with the increasing popularity of Internet VPNs, that need could change, according to Chris Gangwish, IT manager at New Hope Communications, a natural products publisher here. "If you have enough LAN-to-LAN connections, it would be worthwhile," says Gangwish, whose network includes a smaller version of the box, called the IntraPort 2.

Gangwish envisions corporations using VPNs rather than dedicated lines or public frame relay services to connect major corporate sites.

VPNs are attractive to users because they replace costly long-haul WAN circuits with the public Internet. Remote users connect to the Internet via dial-up or dedicated lines and establish connections with a corporate site over the 'Net. Using an IntraPort box at the central site and IntraPort clients on the remote PCs, those session are secured using Data Encryption Standard 3 encryption.

IntraPort boxes can also establish links between each other, so regional corporate sites could establish multiple simultaneous sessions with other sites.

**Compatible's** *IntraPort Enterprise-8 VPN server.*

Gangwish says he has not yet determined the cost savings for New Hope but knows they will be significant. Some remote users have been directly dialing in to Colorado from New Jersey on 800 lines and leaving the connections up all day.

By comparison, the monthly cost per remote site can be as low as the $20 charge for an Internet account, he says.

Gangwish hopes to start connecting New Hope offices in Trinidad and Tobago, London and St. Petersburg, Russia, via IntraPorts. Currently, those

*See* Compatible, *page 12*

# Symantec goes corporate

**By Tim Greene**
*Cupertino, Calif.*

Symantec won't be just pcAnywhere anymore.

Starting next year, the pioneer of remote access software will shift its focus from the single remote user and will change its software to make things easier for corporate IT managers. The goal is to simplify the management of PCs that belong to on-the-road or telecommuting workers.

One Symantec software package, Mobile Update, sends file changes to remote users via e-mail, and will simultaneously support multiple e-mail platforms — such as Microsoft Mail and Exchange, Lotus cc:Mail and Notes, and all Simple Mail Transfer Protocol mail servers. While Mobile Update supports five e-mail platforms, each requires its own Mobile Update server. In 1999, a single server will support all five systems simultaneously for enterprises using multiple e-mail platforms.

In addition, Symantec will upgrade its Norton Mobile Essentials software to allow IT managers to configure remote laptops for use in different locations.

Norton Mobile Essentials automatically sets up laptops to dial the correct remote access numbers and access local network printers and servers. So when users take their laptops from site to site, they don't have to spend time reconfiguring them.

The 1999 version of Mobile Essentials will enable network managers to change the automatic settings remotely, lifting that burden from the end user and reducing support costs.

Symantec already has improvements lined up for its 6-week-old PC Telecommute, software designed to simplify the lives of telecommuters. The software permits remote control of the office PC from home, and it synchronizes home and office PC files as they are worked on. In 1999, Symantec will update the product so remote users can synchronize files residing on corporate servers, not just individual PCs on the corporate network.

Mobile Update costs $3,000 per server with 10 client licenses. PC Telecommute costs $99 per remote user, and Norton Mobile Essentials costs $79.

© Symantec: (800) 441-7234

### SYMANTEC AIMS TO MAKE REMOTE ACCESS MANAGEMENT EASIER

**Look for management enhancements to Symantec's remote access software in 1999.**

| Product | Description | New for '99 |
|---|---|---|
| Norton Mobile Essentials | Changes laptop settings automatically based on location. | Central administration of settings and changes. |
| Mobile Update | Updates files via e-mail attachments. | Support for multiple e-mail platforms from a single server. |
| PC Telecommute | Synchronizes remote PCs with central-location PCs. | Support for connecting laptops with servers. |

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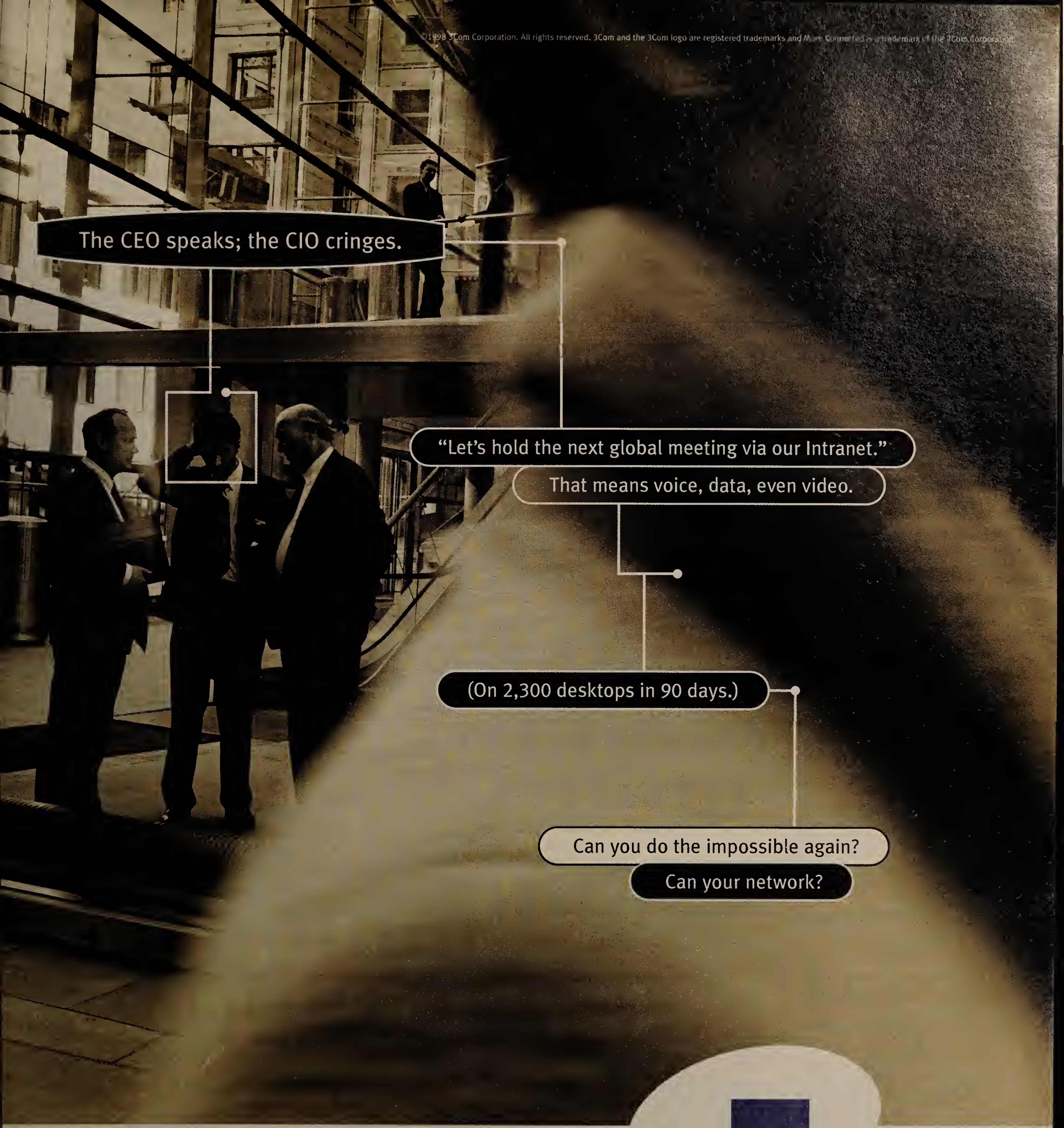
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# Notes goes back to the future

*Version 5.0 will provide the choice of old or new user interface.*

**By Paul McNamara**
*Cambridge, Mass.*

Perhaps mindful of the famous New Coke debacle, Lotus has decided to offer customers both a radically redesigned user interface and the familiar Notes desktop next month when Version 5.0 of the company's flagship product ships.

Since talk of Notes 5.0 began almost two years ago, Lotus has emphasized the importance of its so-called Headlines page. It is a browser-like interface that will give end users a customizable at-a-glance view of their most important e-mail, tasks, appointments and Internet resources.

### Beta-testing feedback

However, Lotus last week acknowledged that enough beta testers had expressed concern about retraining workers to use Headlines to justify offering everyone a choice of looks. That choice and a number of previously unseen Headlines features will be reflected in a second public beta of Notes 5.0, which Lotus expects to post to its Web site this week.

Customers and industry experts are lauding Lotus' decision not to force the new interface on customers.

"I love the idea of this front page [Headlines] that will show you everything you want," says Jerry Fain, manager of IT at Winter, Wyman & Co., a Waltham, Mass., recruitment firm.

SHAWN HENRY

*"I am so afraid of trying to teach the new Notes look to my users. You've got to retrain people from scratch on how to get to their information."*

**Jerry Fain,** manager of IT, Winter, Wyman & Co.

However, Fain says his experience with the first beta produced significant concerns.

"I am so afraid of trying to teach the new Notes look to my users," he says. "You've got to retrain people from scratch on how to get to their information."

Providing interface options in Notes 5.0 may prove to be a double-edged sword, according to David Marshak, a senior consultant with Patricia Seybold Group in Boston.

"It's certainly going to alleviate anxiety on the part of current customers who have invested in training and learning the Notes user interface," Marshak says. "The downside of it though is that it may keep people from using the new interface."

### Old-version limitations

Moreover, according to Lotus, those opting for the old interface will be unable to take advantage of new Version 5.0 features that allow customers to bookmark a wide variety of in-house and Web data sources.

Also being introduced in the second beta is an initial out-of-the-box view, tentatively called Task Center, which is designed to help users start and navigate, the various features of the release.

Company officials insist the Notes client and Domino 5.0 server upgrades will ship before year-end, despite earlier delays in releasing public beta software and the need to incorporate customer feedback about next week's release into the final product.

However, hitting the year-end target may not be all that critical, according to Marshak.

"Certainly the key date is Lotusphere [Jan. 17-21] in terms of getting the excitement going and having people walking away ready to take next steps" toward deploying the upgrades, he says.

✆ Lotus: (617) 577-8500

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# Calif. to open for business – electronically

**By Ellen Messmer**
*Sacramento, Calif.*

The state of California last week leapt into electronic commerce by awarding a $6 million contract for a new procurement system.

The contract winners include Ariba Technologies for its Web-based online catalog product; PeopleSoft for its enterprise resource planning (ERP) application; and Andersen Consulting as the project's system integrator.

Chuck Grady, the deputy director of California's procurement division, expects to see state agencies begin online purchasing a little over a year from now.

The electronic commerce project is designed to let administrators post large state contracts electronically and to allow agencies throughout the state to order from the Ariba catalog server.

In addition, the California electronic commerce system promises a way to issue more complex requests for proposal via the PeopleSoft application, which Andersen will integrate into the Ariba server.

"Today, these schedules are all on paper," Grady says.

Grady, however, harbors no illusions that state agencies are going to race toward this new way of doing business. "We'll probably have to nudge the agencies into using this system," he says. Unlike the federal government, California has no plans to mandate electronic buying and selling.

Joanne Payan, California's manager of IT services, says the state will be using the PeopleSoft ERP application when an item or service is not available through an existing contract and has to be negotiated separately.

"The Andersen team is integrating the ability to issue solicitations via the PeopleSoft application," Payan says. If an agency requires a special truck, for example, an online request could be issued using the PeopleSoft client software that will be installed on the desktops of authorized users.

**Chuck Grady,** *of California's procurement division, plans to nudge agencies into using the new net.*

The larger state agencies, such as the Department of Corrections, the California Transportation Department and the Department of Social Services, are expected to be among the first agencies to make use of the California Statewide Procurement Network when it's up and running in January 2000.

"We have about 250 different agencies and boards that may end up using the network," Grady says. ■

SPOTLIGHTSERIES

Justifying the move to Gigabit Ethernet can be a challenge. In this week's Spotlight Series forum, we have **Tony Lee,** product line manager at switch company Extreme Networks and chairman of the Gigabit Ethernet Alliance, discussing the economics of Gigabit Ethernet. He'll answer your questions about the new technology's potential and what type of return on investment you can expect to get by deploying it in your LAN. So head online and let this expert help you decide whether going gigabit is right for you.

**Tony Lee,** *product line manager at Extreme Networks.*

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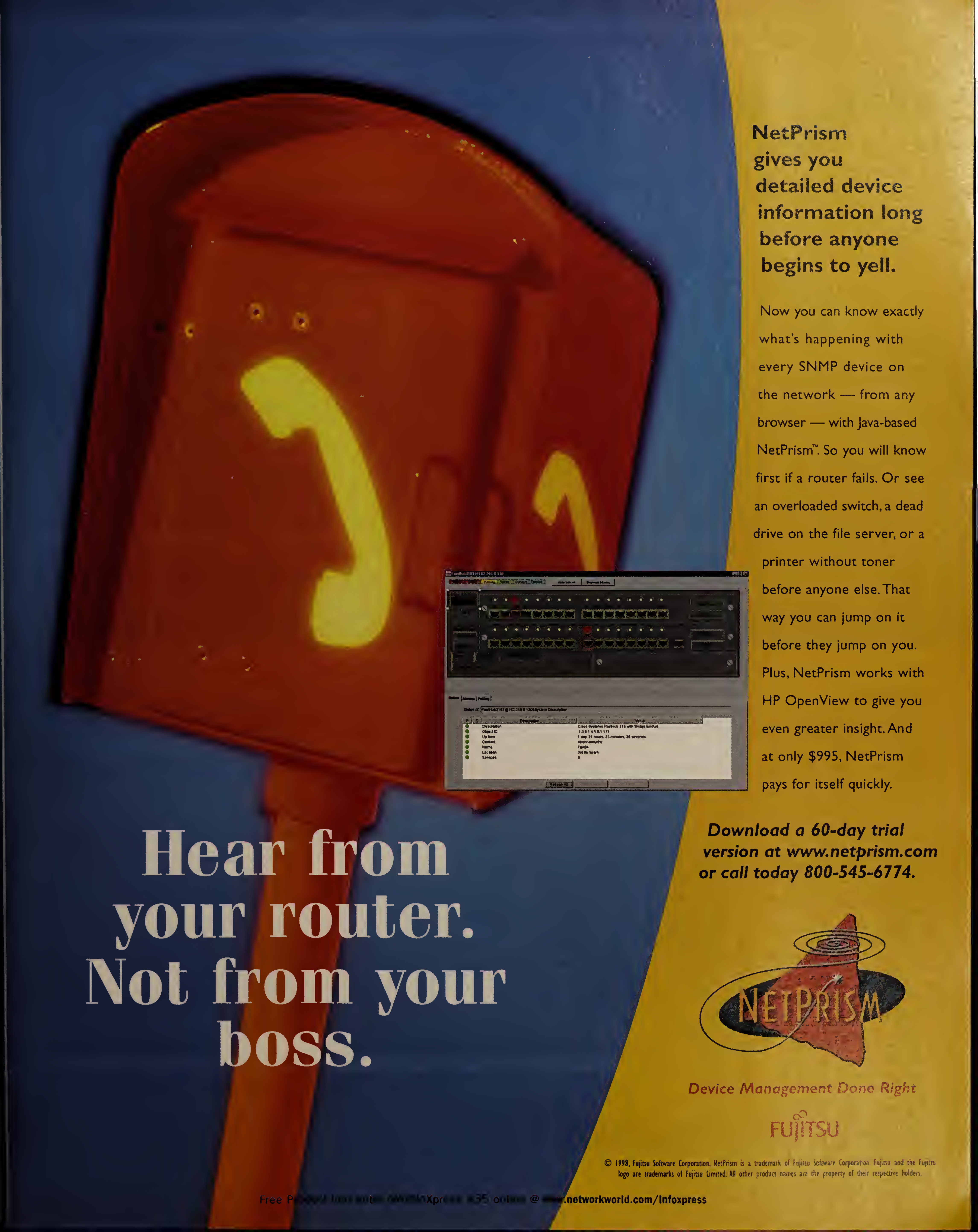

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# Nortel deal another feather in Novell's NDS cap

*Novell Directory Services to be integrated with Nortel management suite, will get Cisco hooks in the process.*

**By Christine Burns**

Nortel Networks last week became the latest big-name company to license Novell Directory Services technology, but observers say it's still too soon to tell whether Novell's "NDS Everywhere" strategy is going to succeed.

Nortel says it will integrate NDS with the Optivity Policy Services policy management application suite being developed by Nortel's Bay Networks division.

This integration will give administrators the ability to allocate network resources based on user identity or other objects defined in NDS, and apply the resources regardless of the user's location or IP address.

Novell's directory will store information from Nortel's routing software, called BayRS, as well as from the company's Accelar and Passport switch lines. Nortel says it also intends to build support for Cisco's internetworking operating system (IOS) routing software in its Optivity product. Therefore, some NDS-enabled management of Cisco hardware could result from this partnership.

Nortel and Novell this week at Comdex in Las Vegas will demonstrate how Optivity Policy Services will tap into NDS. But Nortel will not deliver the product until the second quarter of next year. Pricing for Optivity Policy Services has not yet been released.

This deal is a crucial one for Novell as it scrambles to get every hardware supplier, independent software vendor and service provider partner it can to invest in NDS before Microsoft gets its own Windows 2000 Active Directory out the door next year.

Novell made an announcement two weeks ago about a partnership with Lucent that is similar to the deal with Nortel, one of Lucent's chief rivals.

Novell officials say they are pursuing similar deals with various other hardware vendors, including Cisco and Cabletron.

Cisco first coined the term Directory Enabled Network in May 1997 when it announced a partnership with Microsoft to make Active Directory the repository for all information about Cisco hardware. Cisco has stated on several occasions that it would offer only limited integration with NDS through emerging standards.

"It would be nice to have Cisco on board," says Michael Simpson, Novell director of product marketing. "But even without it, we now have over 50% of the switch market covered with NDS links."

### ABOARD THE NDS BANDWAGON

**Key NDS backers include:**

- AT&T
- Nortel Networks
- Caldera Systems
- Hewlett-Packard
- IBM
- Lucent
- Netscape
- Oracle
- PeopleSoft
- Tivoli Systems*

*Not yet announced.

**Companies Novell longs to get on board include:**

- Ascend
- Baan
- Cabletron
- Cisco
- Computer Associates

Despite Novell's optimism that its NDS Everywhere strategy is beginning to give the company renewed credibility in the industry, observers note that Novell still seems to be the only one selling many NDS-enabled products.

Novell has had success selling NDS offerings, such as NDS for NT and ZENworks, says Todd Chipman, an analyst with Giga Information Group in Santa Clara, Calif. "But most of Novell's joint ventures just aren't panning out as well as I think Novell had anticipated they would," he says.

Chipman points to the fact that Sun, in spite of signing an NDS licensing agreement, has opted to develop its own Lightweight Directory Access Protocol directory service for its Solaris operating system. "Likewise, sales of Hewlett-Packard's and IBM's Unix NDS ports aren't exactly selling wildly," Chipman says.

Novell is now working on its own NDS integration with Solaris, and Simpson says the company is considering building a product that is less cumbersome to deploy than the existing NDS port for HP-UX.

Meanwhile, customers are happy to see Novell pursuing partnerships with key network equipment and software suppliers.

"Nortel and Lucent are major enterprise network competitors, and I am glad to see that they recognize NDS' strengths," says Larry Bradley, senior network engineer with the Robert Emmett McDonough School of Business at Georgetown University in Washington, D.C.

"I already have a directory that works very well. I do not need another directory. I need products that work with the one I have," he says. ■

# Novell enters middleware market

*Joint venture with B2Systems yields database management tool.*

**By Christine Burns**
*San Francisco*

Novell last week began a public beta test for middleware designed to let system administrators more easily manage information across disparate networked databases.

Novell SQL Integrator for NetWare — the product resulting from a Novell joint venture with B2Systems — runs on NetWare 4.11 and 5.0 servers. The software presents information from multiple Open Database Connectivity databases as if the information resides on a single database. That means SQL Integrator makes it possible to review, analyze, change, update and delete data across the network from a single location. All security parameters of each database remain intact because user access is monitored via Novell Directory Services.

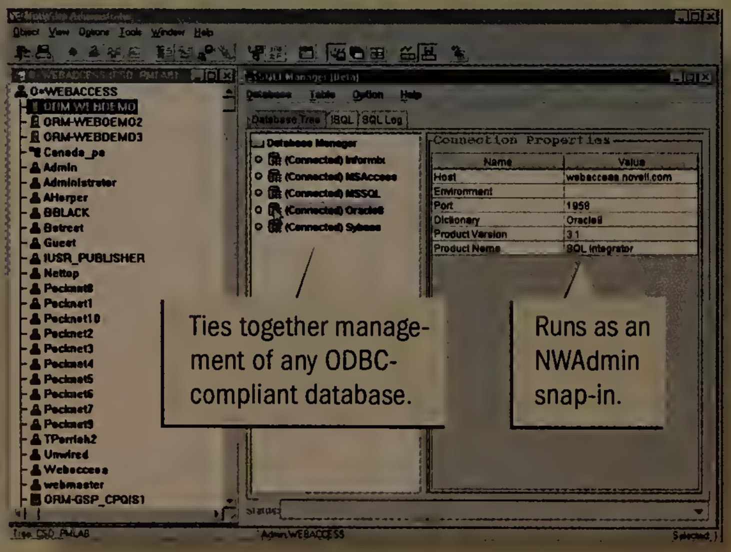
SQL Integrator has a software engine that parses and distributes the SQL requests it receives from client applications. The processing is done on the server all at once, rather than on the client, which would require multiple requests to databases distributed across the enterprise. As a result, SQL Integrator reduces the amount of data passing across the network, Novell officials said last week at Oracle OpenWorld.

Novell SQL Integrator will support Oracle, Sybase, Informix, Microsoft SQL Server and Access, and IBM's DB2. Users can download the beta from Novell's Web site at www.novell.com. Officials expect the product to ship in the first quarter of next year. Pricing has not yet been set.

✆ Novell: (888) 321-4272

### JOINING DIFFERENT DATA STORES

**Novell's SQL Integrator for NetWare lets network administrators manage multiple ODBC-based database servers with NDS.**



| Name | Value |
|---|---|
| Host | webaccess.novell.com |
| Environment | |
| Port | 1958 |
| Dictionary | Oracle8 |
| Product Version | 3.1 |
| Product Name | SQL Integrator |

## Compatible

*Continued from page 8*

offices have no direct access to the corporate network because the links would be too expensive, he says.

Supporting 40,000 simultaneous connections puts Compatible's offering well ahead of the competition, notably the Contivity line from the Bay Networks division of Nortel Networks, according to Jeff Wilson, an analyst with Infonetics Research. Wilson says the closest competition only supports 5,000 simultaneous sessions.

Compatible's IntraPort Enterprise-8 is an eight-slot chassis that can take up to eight 10/100M bit/sec Ethernet port cards, each of which can handle 5,000 sessions, or eight cards that can handle 64 simultaneous LAN-to-LAN connections.

The boxes can be installed behind or in line with a corporate firewall.

A fully loaded IntraPort Enterprise-8 costs $122,000.

✆ Compatible: (303) 444-9532

## CLARIFICATION

PeopleMover's Remote Application Entry (*NW,* Nov. 2, page 35) is not available for free, but is part of the company's enterprise workforce management tool suite. For more information, call (617) 560-5223.

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# Netscape browser engine faster, more portable

*Ultralight offering by company could open up opportunities in the consumer electronics market.*

**By Robin Schreier Hohman**
*Mountain View, Calif.*

Netscape's plans for a new browser engine that will weigh in at just 1.4 megabytes — small enough to fit on a single floppy disk — may mean you'll eventually be able to surf the Web using Navigator from a palmtop device, cellular phone or even a pager.

The company last week divulged its next-generation technology, code-named NGT, which will evolve into the brain behind all future client products. NGT will be fully compliant with the World Wide Web Consortium standards, such as HTML 4.0; Cascading Style Sheets, which allow you to create styles for Web pages; the Document Object Model, which lets you program Extensible Markup Language documents; and XML.

Information about NGT and other Netscape applications in development are available at the Mozilla.org site at www.mozilla.org.

By releasing the source code for the new browser engine, Netscape hopes to mimic the success of the open development of the Linux operating system. Last March, Netscape released the source code for its Navigator browser.

Developers are being encouraged to develop, test and contribute ideas for the new browser engine.

NGT won't affect the way Navigator looks, but it will make it possible for Netscape to create the user interface based on open Internet standards such as HTML, which runs on all platforms without porting, says Micki Seibel, a senior product manager at Netscape.

By divorcing the user interface from the browser engine, Navigator will become completely modular. "You end up with a browser that's extremely small and extremely fast," Seibel says.

Although Seibel acknowledges that a smaller browser engine makes it possible for Navigator to run on smaller handheld devices, she wouldn't say whether Netscape is currently developing for these types of systems.

Netscape last week also announced a new application, Netscape BillerXpert 1.0, that can present bills and execute payments online. Users will be able to customize the software, and Netscape expects to see deployment in the telecommunications, utility and banking markets.

BillerXpert is available now in limited distribution on Sun Solaris. It will be generally available in the first quarter of 1999 and is priced at $250,000 for two CPUs.

Additionally, Netscape announced that it will buy AtWeb, an online Web site services company, in a stock swap valued at more than $90 million. With the purchase, Netscape gets 600,000 registered AtWeb users, with which the company hopes to enhance its Netcenter portal's small-business channel. ■

### NETSCAPE'S BROWSER ENGINE TUNE-UP

**Netscape's new lighter browser engine will be standards-compliant, and will support:**

- HTML 4.0
- Cascading Styles Sheets
- XML
- Document Object Model
- Resource Description Framework

# Software to ease Oracle database management

**By Jeff Caruso**
*San Francisco*

Users will now be able to more effectively tune and monitor their Oracle databases with a variety of new systems management software products designed specifically for those databases.

At last week's Oracle OpenWorld conference here, Platinum Technology of Oakbrook Terrace, Ill., announced ProVision for Oracle, which has new tools for developing, analyzing and backing up databases. Platinum already offers tools for reorganizing and managing the performance of databases, and these are included in the suite. ProVision is the company's line of systems management software tools.

Duke University has used the Platinum software to monitor its Oracle databases that contain information for students. ProVision helped the school discover that the high CPU and memory usage on its servers was being caused by a couple of processes fighting each other to get at the same data, says Jill Meninger, database administrator for Duke's Fuqua School of Business.

The new backup tool in ProVision can synchronize and automate backups of Oracle databases across an enterprise from a central place, the company says. The software can restore lost data without having to perform a full database recovery. The suite also includes a tool for tuning SQL commands in applications for the best performance.

ProVision for Oracle will roll out in January 1999, with tools priced from $695 to $5,000 each.

BMC Software in Houston introduced the Patrol Availability Suite for Oracle, which integrates monitoring of Oracle databases with its existing, more generic database utilities. The utilities manage space, reorganize databases and check the integrity of databases. The software will ship in mid-November, and will support Oracle versions 7.2, 7.3 and 8.0 on HP-UX, Sun Solaris, IBM AIX and Windows NT. Pricing depends on the number and size of the servers used.

Computer Associates International released a Windows NT version of its Oracle Agent for Unicenter TNG. The agent monitors the status and performance of Oracle databases. The Islandia, N.Y., company also incorporated support for Oracle Web Server into its software for managing Web applications.

✆ Platinum: (800) 442-6861; BMC: (800) 841-2031; CA: (516) 342-5224

# Larry Ellison steals Oracle's show

*But the database company does squeeze in some product news.*

**By John Cox**
*San Francisco*

Instead of calling last week's conference Oracle OpenWorld, perhaps Oracle should have named it "Larry's Own Little World."

Oracle Chairman Larry Ellison used the company's annual customer gathering to formally launch Oracle8i, the Internet version of the company's database product. And, as he often has done in the past, Ellison enjoyed himself immensely at the expense of Microsoft Chairman and CEO Bill Gates.

There was little real news at the conference, considering Oracle8i had been ballyhooed several weeks earlier. But Ellison used his captive, if appreciative, audience of thousands of Oracle customers to send home a simple message: Store everything in an Oracle database, and use the database for everything you do with the World Wide Web.

## Database plus

"This is not just a database anymore," Ellison said as he prowled the stage. "Everything is inside this one platform. And the only thing you need to get to all this is a browser, whether it's on a cheap handheld phone or a powerful desktop PC."

In support of his message, Ellison quoted what he said was an observation by Bill Gates: "'Gee, it's getting harder and harder to find things on my PC. Maybe everything should be in a database.'" There was a one-beat pause. "The man is brilliant," Ellison said, sparking a round of laughter and applause.

**Ellison launches** *Oracle8i and an attack on Gates.*

Oracle did have a few new things to introduce, too, including Extensible Markup Language (XML) support for Oracle8i, as well as Oracle application servers and Web tools. By using XML, an emerging Web standard for representing data, Oracle said customers can enable an array of applications to exchange data much more easily than they could in the past.

XML will be included with Oracle8i by year-end, with Oracle Application Server 4.0 by June 1999, with the Oracle Jdeveloper tool set by April 1999, and with other Oracle development tools later in 1999.

Oracle also announced it will acquire Concentra Corp., which sells a software program used in customizing quotes and orders for complex products. The software will be integrated with Oracle's front-office and manufacturing-software products.

Oracle will make a cash tender offer for Concentra's stock. Oracle estimated the value at about $43 million.

Also at the OpenWorld conference, Oracle released the beta version of Jdeveloper 2.0, a development tool set for building multitier database applications in Java. Release 2.0 supports Oracle8i, Oracle Application Server 4.0, and Enterprise JavaBeans and Java servlets.

Separately, Dell Computer said it will now install and test Oracle8, and later, Oracle8i, on its line of PowerEdge enterprise servers. ■

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# Compaq advances state of NT clustering art

By Deni Connor

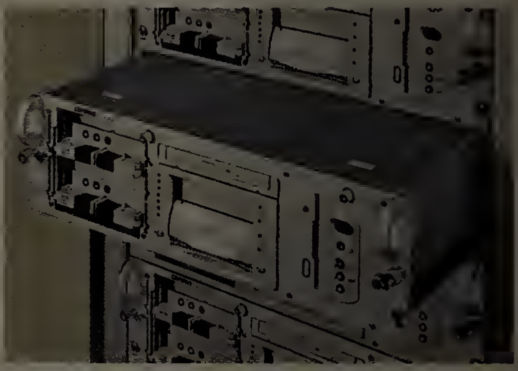
The large-scale clustering of Intel servers is one step closer to becoming reality, thanks to a massive 72-node clustering demonstration conducted by Compaq.

Last week at Sandia National Laboratories in Albuquerque, N.M., Compaq ran a trial of 72 clustered Proliant 1850R servers. The servers are part of a production network that Sandia uses for conducting government research.

The ServerNet-I-enabled cluster of Windows NT servers sorted a terabyte of data in under 50 minutes, exceeding the mark of 152 minutes previously performed by a Silicon Graphics 32-processor supercomputer. Six to seven minutes could have been cut off the time had the Sandia team used the 10,000-rpm disks presently available, rather than the 7,200-rpm disks Sandia has installed.

While it is unlikely that this demonstration will result in a 72-node clustering product from Compaq anytime soon, it shows that NT systems can potentially sort through huge amounts of data, like that found in decision support applications, data warehousing and Web engines.

An unreleased Aberdeen Group study shows that 25% of Windows NT networks use some type of clustering or failover technology, compared with 10% a year ago. "There is an increased interest in clustering. The application environment on NT is starting to be perceived as more business-critical," says James Gruener, senior analyst with Aberdeen Group in Boston.



**Compaq used its Proliant 1850R** *servers as basis of massive cluster.*

Gruener adds that as more companies rely on mail-messaging systems, they are being recognized as mission-critical applications that require high availability.

### A direct hit

On another front, at a lavish New York City press conference last week, Compaq announced its long-awaited plan to sell products directly to users, a move designed to counter Dell's monumental success in the low-end server market.

Aimed at small and mid-size businesses, Compaq is now selling two Prosignia servers direct — the Pentium II-based 720 and 740.

Pricing for the Prosignia 720 starts at $1,447, while the 740, which includes the Insight management package, begins at $1,731. Both servers can be leased.

Meanwhile, on the pure multiprocessing side, Compaq this week is expected to quietly demonstrate a pre-release eight-chip NT server at Comdex.

✆ Compaq: (800) 282-6672

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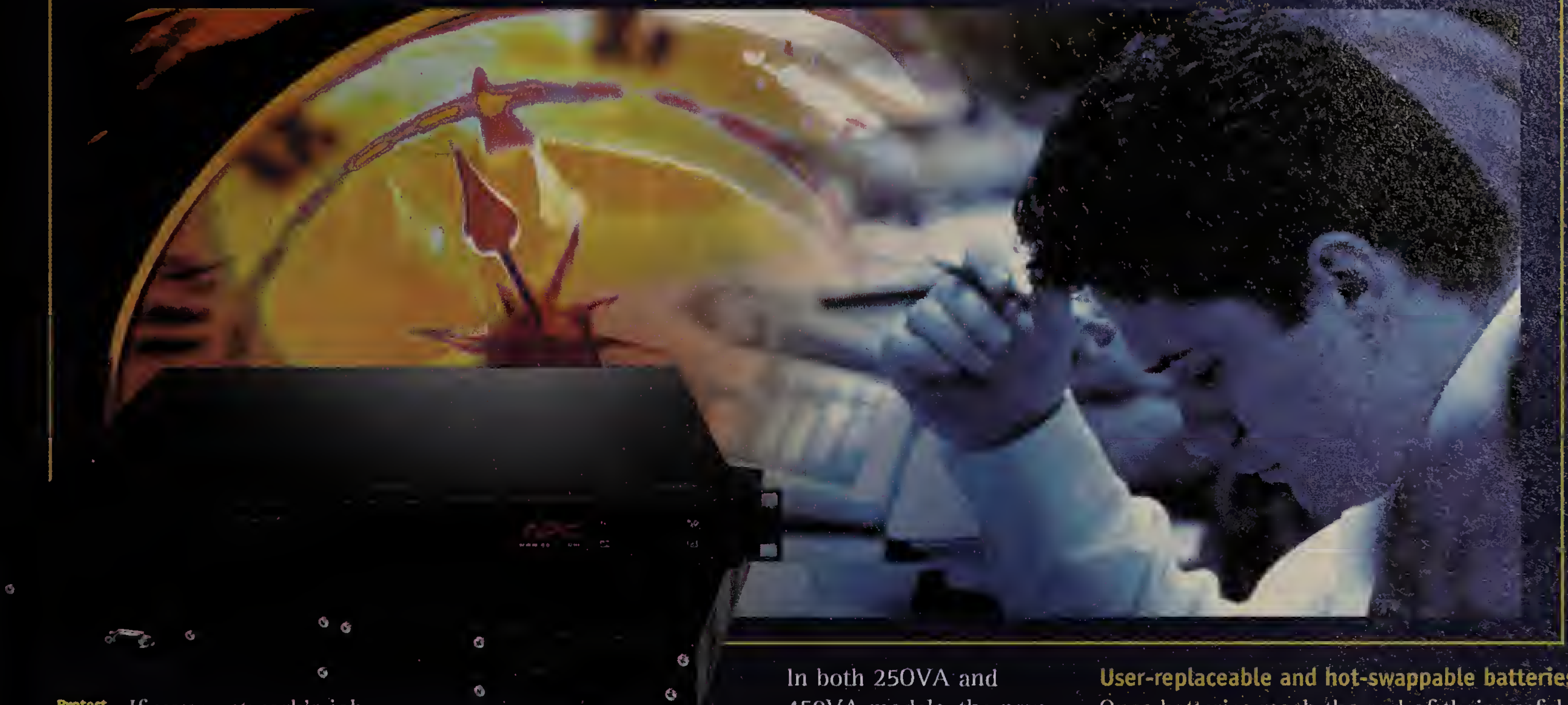
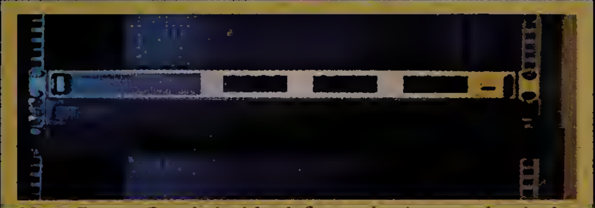


If your network's job is to speed data from point A to point B, what happens when the power stumbles and fails while the trip is only half over? Bad packets, reset switches, downed hubs, irate users... the list goes on and gets uglier with every second of downtime. A server-based Uninterruptible Power Supply (UPS) protects only a small part of the data path, but now there's APC PowerStack, a UPS designed specifically for the places between your servers: hubs, routers, switches and bridges. Best of all, it's from the company that protects more networks than all others combined: APC.



*New PowerStack is ideal for today's popular hubs, routers and switches, giving up to 40 minutes of runtime for a typical Ethernet Switch. Hit www.apcc.com to find out more.*

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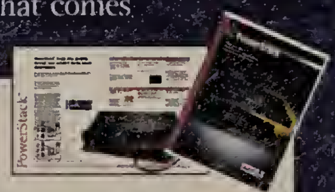

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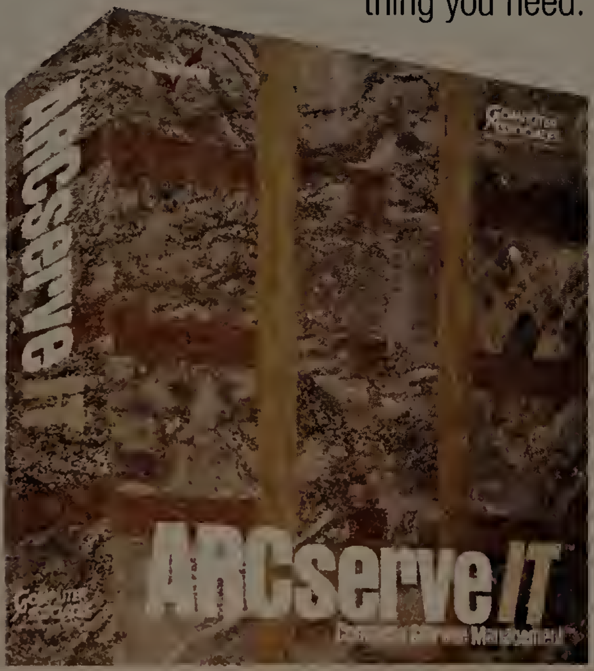

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## Competition doesn't worry Xylan CEO

*Kim says his firm is well-positioned in the enterprise switch market, despite presence of Lucent, Nortel.*

Xylan is usually described as occupying a narrow slice of the enterprise network market — the sparsely populated middle ground between the teeming mass of start-ups and the handful of multibillion-dollar companies that own the top tier.

But Steve Kim, founder, president and CEO of the Calabasas, Calif., company, says Xylan has already cracked the top tier of high-end enterprise suppliers. This is thanks to what he describes as Xylan's advanced technology offerings and missteps on the part of competitors.

In this interview with *Network World* Editor in Chief John Gallant, Kim opines on Xylan's strategy, the impact of Lucent and Nortel in the enterprise equipment market, and more.

**With all of the consolidation and change taking place in the network market, is Xylan's strategy changing?**

We have the same strategy we've had for over five years — offering true high-end, switch-based solutions. When you are dealing with high-end customers, there are a lot of different problems you need to solve. We need to offer Layer 2, 3 and 4 solutions, constantly boost the speed of our products, work in heterogeneous environments, etc. Those are difficult things to do.

Our competitors are trying to do those things by buying other companies. It's taken us five years to develop these compelling end-to-end solutions. But they're all developed internally — no acquisitions. We have the same [Application Specific Integrated Circuit] family, one network management platform and one architecture. It is very hard for our competitors to patch together all of the things they've bought into a single solution, especially when you are talking about end-to-end virtual LANs, security or directory services. Our approach brings the customer a lower cost of ownership and a longer lasting product line.

**But the positive side of acquisitions, at least if you believe Cisco, is that they enable you to get into new technology areas without risking a lot on research and development. You can wait to see which areas will be important and grab the hot start-ups.**

*See* Kim, *page 22*

## Start-up dispenses self-healing apps medicine

**By Jeff Caruso**
*Palo Alto, Calif.*

One of Raman Khanna's pet peeves is that sometimes a desktop system can seem to be working fine until someone installs an application or receives a plug-in over the Web. Then all of a sudden the system crashes.

"Networks are more reliable these days; most of the time problems happen on the desktop," says Khanna, who is chief information officer at Stanford University.

That's why Khanna is testing software from Tioga Systems, which earlier this month unveiled its Self-Healing System. The software keeps track of the state of applications on various desktops throughout a network.

It also knows which software components the applications depend on. If upon installation one application overwrites a Dynamic Link Library (DLL) another application depends on, Tioga's product will automatically reinstall the original DLL. Applications can rely on thousands of components, such as management files, executables, data files and software objects.

The conflicting configurations of different applications on a desktop are the main reason that software isn't as reliable as hardware, says Mark Pincus, CEO of Tioga. New software gets introduced on the desktop all the time, especially with more plug-ins for Web browsers available over the Internet.

To keep applications from treading on one another, Tioga's agent software records all of a program's dependencies, then periodically checks to ensure that those components haven't been altered. If they have, the agent can retrieve a backup copy of the components from a central server, which can be based on any Network File System-accessible file server.

Khanna says the software, which Stanford has been using for a couple of months, has already helped to restore one desktop system. The agents are deployed on about 100 desktops there. He says he hopes the software will mean fewer calls to the help desk and more uptime among the desktop systems.

Stanford engineers are still checking to make sure Tioga's software integrates well with the university's Remedy help desk software and its Windows NT and NetWare servers. Khanna says he would like to see Tioga's software evolve into a more complete asset-management system for controlling inventory. "Otherwise, you end up using too many point products," he says.

Tioga intends to expand its product to manage the life cycle of applications, from testing and installing to repairing and uninstalling, Pincus says.

The Self-Healing System monitors Windows 95, 98 and NT systems, and the management console runs on Windows NT.

The software is shipping now, with pricing starting at $10,000.

☎ Tioga: (650) 565-8600

### PROFILE: TIOGA SYSTEMS

**Headquarters:** Palo Alto, Calif.

**Founded:** May 1997

**CEO:** Mark Pincus, who co-founded FreeLoader, a provider of Web-based push services, and sold it for $38 million in 1996 to Individual, Inc. One year later, Individual axed its FreeLoader operations.

**Main product:** Self-Healing System, software that makes sure applications don't interfere with one another on desktop systems.

**Funding:** $8 million from Accel Partners, Softbank Technology Ventures and Comdisco.

**Fun fact:** "Tioga" is a Native American word meaning "entrance" or "pass." The company chose the name because it is distinctive and the domain name was still available.

## Briefs

**3Com** *has unveiled a* **Gigabit Ethernet switch** *designed for high availability and has announced a strategy to ensure resiliency in multiservice enterprise networks.*

*The CoreBuilder 9400 sports 24 Gigabit Ethernet ports and supports backup and aggregated links for network uptime, redundancy and load balancing.*

*It costs $36,000 for 24 1000Base-SX ports and $48,000 for 12 SX and 12 1000Base-LX ports. The switch will be available in the first quarter of 1999.*

*3Com's network resiliency strategy is geared toward supporting the IEEE 802.3ad Link Aggregation standard for point-to-point connections and aggregating multipoint links.*

*3Com is also adding the Virtual Router Redundancy Protocol and application response time monitoring software across its building, campus backbone, data center and WAN access products.*

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**EMC** *has introduced Volume Logix,* **configuration management software** *for storage networks.*

*A component of EMC's Symmetrix Enterprise Storage system, Volume Logix manages server authorization to access storage on Windows NT networks. In a shared storage environment, Volume Logix allows storage administrators to control access to storage for each server on the network.*

*Symmetrix Enterprise Storage supports Fibre Channel, Fast-Wide Differential SCSI, Ultra SCSI and ESCON connections, allowing a wide variety of storage option support.*

*It operates on IBM, Compaq, Dell and Hewlett-Packard servers running Windows NT.*

*Pricing for Volume Logix ranges from $15,000 to $35,000, depending on the Symmetrix configuration.*

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## Kim

*Continued from page 19*

That sounds like some kind of a visionary approach to networking — acquiring companies to keep up. You can go out and acquire bits and pieces of technology. But customers don't want a hodgepodge; they want an integrated solution.

**Does that mean you aren't interested in acquisitions?**

We always look at them. But we're smarter about this. Sometimes companies are making acquisitions just to recruit people. But we've built 10 development centers around the world, in places like India; Irvine, Calif.; Utah; North Carolina; Salem, N.H.; and Acton, Mass. And at those centers we are constantly expanding our capabilities. That's almost like buying companies. We let these centers focus on adding unique functions and capabilities, and they help us to recruit people.

But we're also looking at areas such as voice over IP. The problem is that the prices for these companies are way up, and we're afraid we will lose all the good people before the deal is even done.

**Speaking of acquisitions, what do you say about all the rumors that Xylan will be acquired?**

There have been rumors out there for the past two or three years, and I'm not going to comment on them. You know, companies usually get bought out when they feel they've reached their limit. That is not the case with start-ups, of course, but look at Bay Networks. They just couldn't come up with the solutions customers needed, and they were losing their market share to Cisco and Xylan. So they threw in the towel.

**Do you think Cisco has locked up the enterprise market?**

[Laughs.] This is a growing market and people are always looking for better alternatives, better technologies and better pricing. To be a $10 billion or $15 billion company in the future, we have to get 10% of the switching market. We'll give Cisco 90% and take 10%.

**How is the enterprise market changing with the entry of Lucent and Nortel Networks?**

The dynamic is changing because voice/data integration is happening. Unless Lucent, Nortel and Alcatel can get into enterprises, they'll lose their other markets. From our point of view, their acquisitions mean we're seeing less competition.

Nortel and Lucent don't have expertise in data, and they don't have the game plan to be successful in the enterprise. They can offer single-vendor solutions for carriers, but when they get to the enterprise, I don't think they can be successful. Data is all new to them. Data is much more complicated.

How will these huge companies adapt to these changes? We don't see Lucent and Nortel out there. Lucent bought Prominet, and now we don't see Prominet anymore.

**What are the key future directions for Xylan?**

We have more bandwidth now than people will need for the next five to 10 years with gigabit or ATM. People will be focusing more on the services for these networks: security, directories, quality of service and multicast. They're the keys for the future. It's easier for us to develop those services because we have one architecture. ■

Get more online:

- An expanded version of this interview.
- Xylan financial and stock information.

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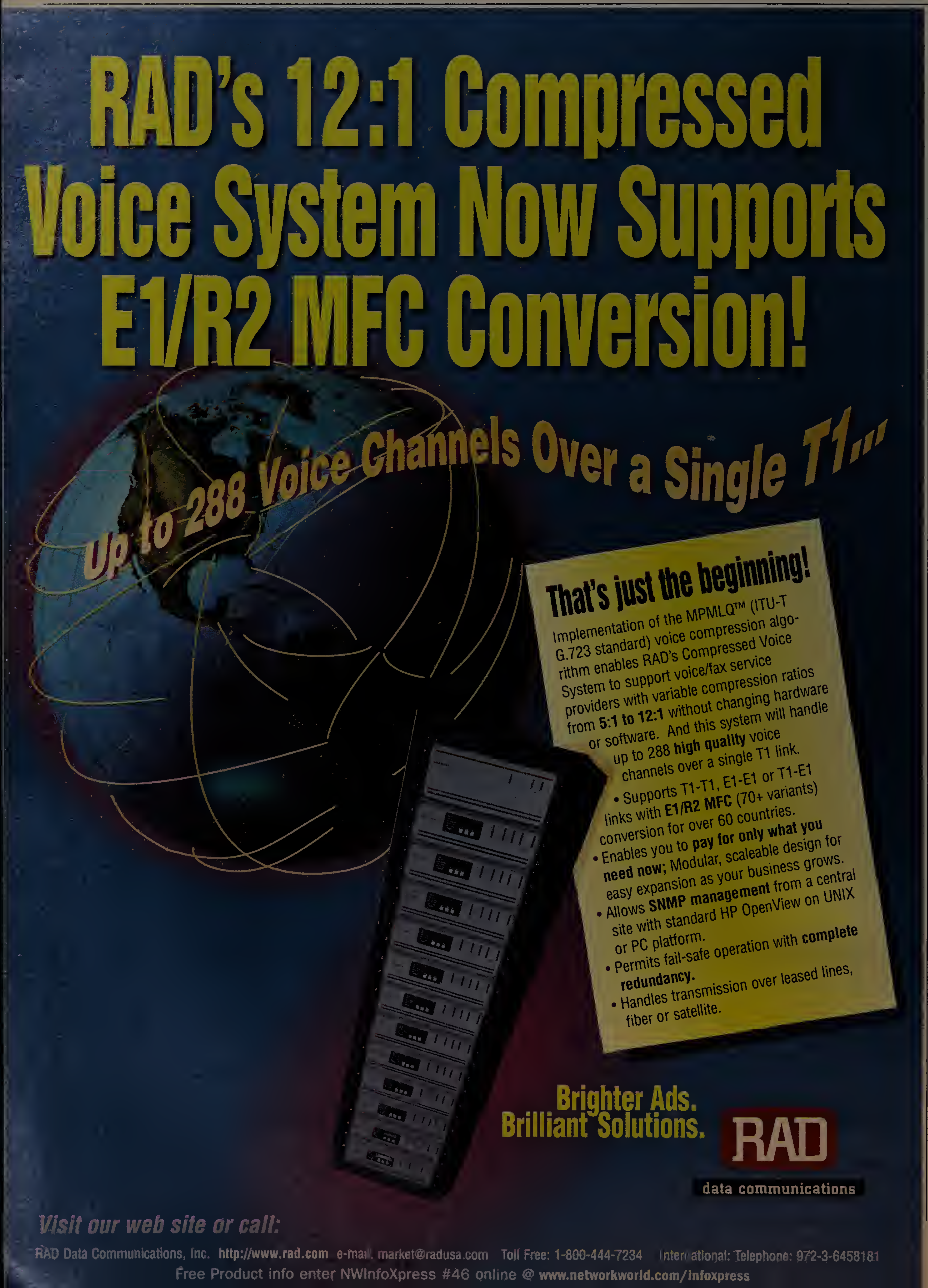

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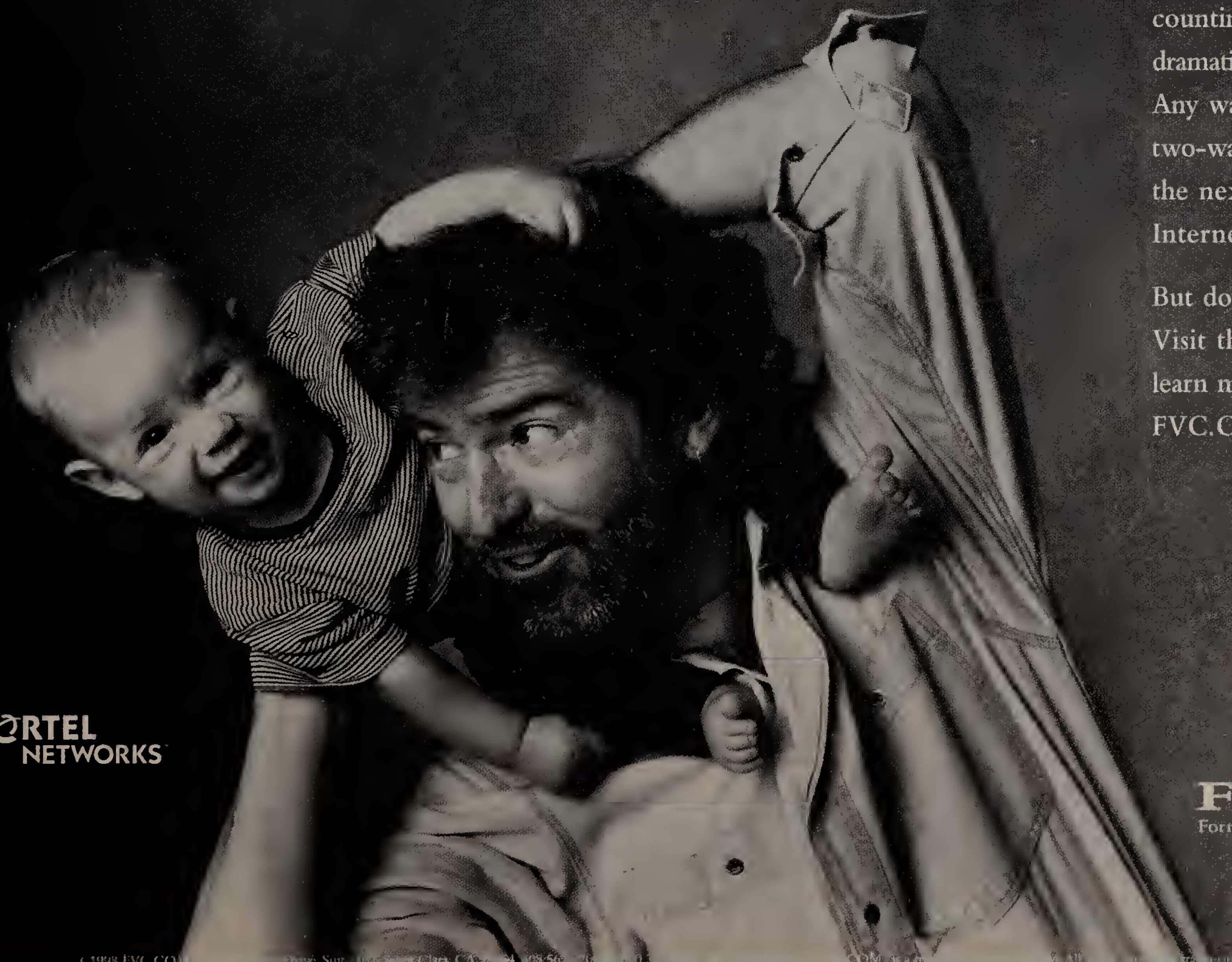

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# De-commoditize a better mousetrap

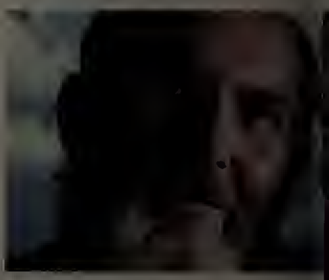
By now, you're probably well aware of the so-called "Halloween" memos. These are the two rather long documents purportedly prepared by Microsoft employees evaluating the risk factors of Linux vis-à-vis Microsoft's operating systems. Microsoft has acknowledged at least one of the memos as a valid internal document.

The documents can be read in their entirety at www.opensource.org/halloween.html.

The documents delve into the reasons for the success of Linux and other open source software (for a definition of open source, see www.opensource.org/osd.html), while pointing out ways that Microsoft can combat the software's growing popularity.

What caught my eye were some of the suggestions for combating the success of Linux and open source software, especially the emphasis on using proprietary protocols and methods (referred to as "de-commoditizing"). Nowhere within the documents was it even hinted at that Microsoft should build a better product.

No, the authors appear to have concluded that only by capturing a market through the use of bundled products running on proprietary protocols (Microsoft has created extensions of publicly available protocols such as HTTP) can the company beat back the open source threat. Commenting on the Halloween memos, Ed Muth, enterprise marketing group manager at Microsoft, says, "[Microsoft] would not be able to solve problems that other people could solve if we stayed with standard protocols."


**Dave Kearns**

Now the memos still would be remarkable if they were written by marketing weasels enamored with proprietary offerings, but these memos were written by engineers!

In my experience with software engineers — I've worked with and managed many over the past 30 years — they invariably believe that they can create a better way to accomplish a task or goal. As a group, they subscribe to the adage that if you build a better mousetrap, the world will beat a path to your door. Rarely, if ever, do they suggest taking the freely available specification for a mousetrap and making it proprietary.

Evidently things are different at Microsoft.

Read the Halloween memos for yourself. And hope that Joel Klein and the other Department of Justice antitrust attorneys are reading them as well.

*Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at wired@vquill.com.*

## Tip of the week

*If you're at Comdex this week — and it appears that all of you are standing in front of me in the taxi line — be sure to check out the dozens of companies offering biometric security and authentication applications. Fingerprint, retinal scan, facial recognition, signature analysis and even keyboard entry analysis (the latter from Net Nanny) are catching on as replacements for or complements to traditional user name and password authentication.*

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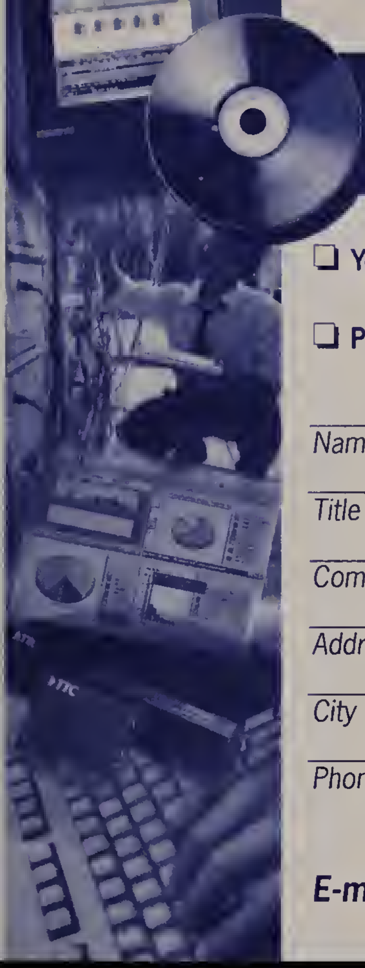

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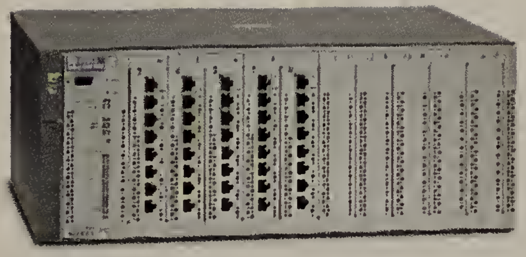

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## Server architectures

# Can NUMA hit the server big time?

*IBM is considering the technology, but Compaq, Dell and others are heading in other directions.*

By Marc Songini and Deni Connor

The life of NUMA server users and vendors can be lonely.

Non-Uniform Memory Access (NUMA) is a symmetrical multiprocessing (SMP) technology most fervently backed by companies such as Data General and Sequent, which claim NUMA overcomes the performance limitations of traditional SMP systems.

But to date, the technology has been rejected by big name server vendors, such as Compaq and Dell, and software vendors, such as Microsoft. Will NUMA catch on in a bigger way in months to come? There are some indications that it could. For example, IBM is giving the technology serious consideration. But most evidence points to the technology continuing to lurk in the shadows.

NUMA proponents claim the technology is an improvement over traditional Intel-based SMP systems that can suffer from traffic jams on their shared-memory buses and typically cannot accommodate more than 16 or 32 processors. With NUMA, each Intel processor has its own local memory and is able to form static or dynamic connections with other chips' memories. NUMA servers can be powered by 64 or more processors.

"NUMA is at the beginning," says Steve Aucoin, director of product marketing at the Aviion business unit at Data General. The company estimates that about half its server revenue comes from NUMA unit sales. "Over the next couple of years, you'll see more major vendors getting NUMA products out there," he says.

Data General and Sequent have been selling NUMA servers for more than a year, and Hewlett-Packard and Silicon Graphics sell NUMA machines to handle certain technical applications. But it is tough to get a handle on the size of the market because vendors don't break out their NUMA sales figures.

However, according to anecdotal evidence, it appears that NUMA systems are working as advertised. "The Aviion 20000 doesn't go down at all . . . NUMA has proven to be a very sound concept," says Peter Clark, manager of information systems at Jordan's Furniture, an Avon, Mass., retailer that has been using an eight-processor Data General NUMA server for about a year. Clarks says he is particularly enamored with the Pentium Pro-based server's ability to balance loads across processors. Previously, Jordan's used a 12-way Data General Aviion 9500, a system that could no longer handle the company's point-of-sale and other applications.

Pricing for Data General's NUMA boxes starts at less than $80,000 for a four-way server, which the company claims can be one-third to one-half of the price of enterprise servers from other companies.

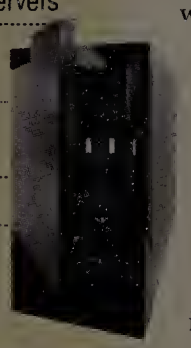
NUMA should prove most attractive to companies running online transaction processing, enterprise resource planning and other processing intensive applications, says Richard Partridge, an analyst with D.H. Brown Associates, a Port Chester, N.Y., market research and consulting firm. He expects more vendors to get into the market once Data General and Sequent work out any kinks in the technology.

### THE STATE OF NUMA

**Who's got it, who's thinking about it, and who's looking elsewhere.**

DG Aviion 20000 server

| Vendor | Position on NUMA |
|---|---|
| Data General | Offers Aviion NUMA servers |
| Sequent | Offers line of NUMA-Q 2000 servers |
| HP | Offers two NUMA server lines through its Convex business |
| IBM | Evaluating the technology for Netfinity |
| Compaq | No interest at this time |
| Dell | No interest at this time |



IBM Netfinity 5000: NUMA in its future?

One of those vendors could be IBM, which is giving NUMA some serious consideration as a future architecture for its Netfinity line of PC servers, says Tom Bradicich, director of server architecture and technology at IBM's personal computer group. He sees a possible role for NUMA in certain server cluster systems.

HP offers NUMA servers through its Convex division. For example, the company offers the Exemplar server for running technical applications and the V Class box for commercial applications. HP is trying to keep an open mind about whether NUMA will play a bigger role in its server products down the road, company officials say.

"We don't take a particular religious position on any of these things," says Brian Cox, a product manager for HP's NetServer division. He says the company's decision to support NUMA more widely would hinge on such factors as SCO's UnixWare or Microsoft's Windows NT gaining NUMA hooks.

Dell is more skeptical. As Microsoft and Intel improve their operating system software and processors, respectively, the need for NUMA will drop off, says Bob van Steenberg, vice president and general manager of Dell's enterprise server division. In three years, SMP performance in NT boxes will exceed that of NUMA machines, he says. "We don't want to go backwards," van Steenberg says.

Compaq has evaluated NUMA for the past two or three years and has paid particular attention to where application vendors are going, says Karl Walker, vice president of technology development at Compaq. "We want to make sure we provide platforms that are consistent with where the majority of the systems and software base is going," he says. "NUMA has some positives. But it has some attributes that we think are not appropriate for a lot of mainstream deployment. We see it as useful more in specialized, highly scientific applications."

Like Dell, Compaq is putting much of its efforts into supporting a message-passing server communications technology called Virtual Interface Architecture (VIA), which Microsoft is supporting. "With VIA, a message can be sent from any processor to any processor regardless of the memory architecture," Walker says. "NUMA architectures are more tightly coupled to the specific memory architecture of a specific CPU and don't lend themselves as well to heterogeneous environments."

Sun says it's doing just fine with its SPARC-based SMP servers running Solaris. "The fallacy is that you cannot engineer large SMP systems when in fact you can, and we have been for the past two years, as evidenced by our 64-CPU offerings," says Ken Won, future systems marketing manager for Sun.

Despite what vendors say, some observers believe that many Unix server vendors are going to slip some form of NUMA technology under the covers of their machines, though they may not necessarily call attention to it.

"In five years, all the players will have this engineering approach in their platforms," Partridge predicts. ■

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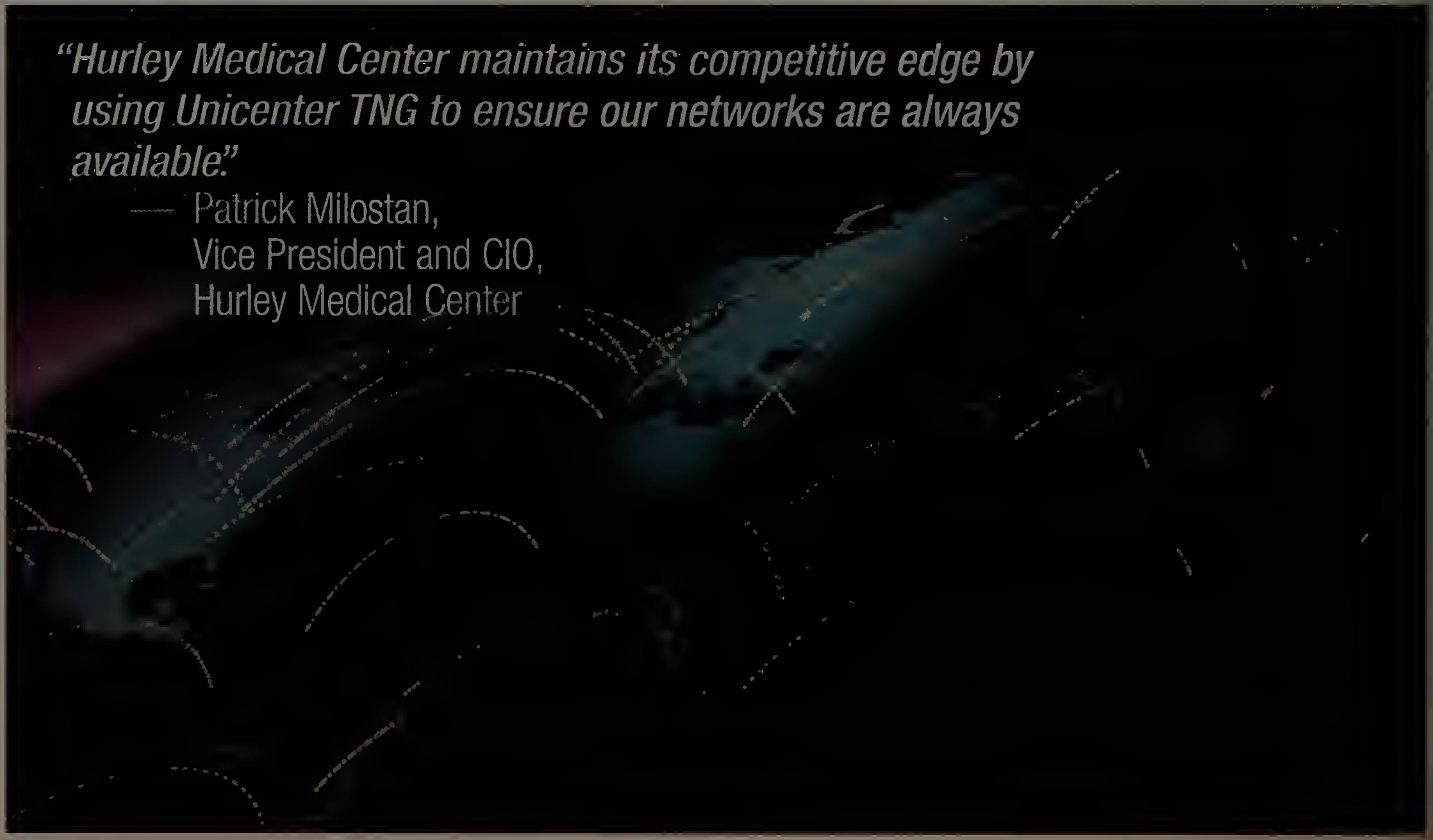

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## 1. What is the principal business activity at your location?

(check ONE only)

01. ☐ Manufacturing (other)
02. ☐ Finance/Banking
03. ☐ Insurance/Real Estate/Legal
04. ☐ Health Care Services
05. ☐ Hospitality/Entertainment/Recreation
06. ☐ Media/TV/Cable /Radio/Print
07. ☐ Retail/Wholesale Trade/Business Services
08. ☐ Transportation
09. ☐ Utilities
10. ☐ Education
11. ☐ Process Industries (Mining/Construction/Petroleum Refining/Agriculture/Forestry)
12. ☐ Government (Federal/State/Local)
13. ☐ Military
14. ☐ Aerospace
15. ☐ Consulting (Independent)*
16. ☐ Carriers/Interconnects
17. ☐ Internet Service Provider (ISP)
18. ☐ Manufacturing (Computer/Communications/OEM)
19. ☐ Resellers of Computer/Network Products (VARs, VADs)
20. ☐ Systems/Network Integrators*
21. ☐ Distributors (Computer/Communications)*
22. ☐ Other (please specify) ______________

** Please complete form based on largest client.*

## 2. What is your job function?

(check ONE only)

NETWORK IS MANAGEMENT:

1. ☐ Network Management
2. ☐ LAN Management
3. ☐ Datacom/Telecom Management
4. ☐ IS/IT/MIS/CIO/Systems Management
5. ☐ Internet/Intranet/Electronic Commerce Mgmt., Webmaster
6. ☐ Engineering Management
7. ☐ Corporate Management (CEO, Pres., VP, Dir., Mgr., Financial Management)
8. ☐ Consultant (Independent)
9. ☐ Other ______________

## 3. What is the estimated value of Network equipment and services that you specify, recommend or approve the purchase of?

(Please print the appropriate number code on the line next to each product category. Please complete ALL categories A–N.)

1. $100 Million or more
2. $50 Million to $99.9 Million
3. $25 Million to $49.9 Million
4. $10 to $24.9 Million
5. $1 to $9.9 Million
6. $100,000 to $999,999
7. $50,000 to $99,999
8. Under $50,000
9. None of the above

A ______ Large Systems (Mainframes/Minis)
B ______ Desktops (Micros/Laptops/Workstations)
C ______ Servers
D ______ LANs
E ______ WAN Equipment
F ______ Carrier Services
G ______ Internetworking
H ______ Internet
I ______ Intranet
J ______ Extranet
K ______ Remote Access
L ______ Peripherals
M ______ Software
N ______ Service/Support

## 4. What is the total number of sites for which you have purchase influence?

(check ONE only)

1. ☐ 100+  2. ☐ 50 – 99  3. ☐ 20 – 49  4. ☐ 10 – 19  5. ☐ 2 – 9  6. ☐ 1  7. ☐ None

## 5. What is the total number of Servers/Clients/LANs installed/planned at your location/ in your entire organization?

(check ONE box in each column)

| SERVERS At Location A | | SERVERS Entire Org. B | CLIENTS At Location C | | CLIENTS Entire Org. D | LANS At Location E | | LANS Entire Org. F |
|---|---|---|---|---|---|---|---|---|
| ☐ | 1. 50,000+ | ☐ | ☐ | 1. 50,000+ | ☐ | ☐ | 1. 50,000+ | ☐ |
| ☐ | 2. 10,000 to 49,999 | ☐ | ☐ | 2. 10,000 to 49,999 | ☐ | ☐ | 2. 10,000 to 49,999 | ☐ |
| ☐ | 3. 1,000 to 9,999 | ☐ | ☐ | 3. 1,000 to 9,999 | ☐ | ☐ | 3. 1,000 to 9,999 | ☐ |
| ☐ | 4. 100 to 999 | ☐ | ☐ | 4. 100 to 999 | ☐ | ☐ | 4. 100 to 999 | ☐ |
| ☐ | 5. 50 to 99 | ☐ | ☐ | 5. 50 to 99 | ☐ | ☐ | 5. 50 to 99 | ☐ |
| ☐ | 6. 10 to 49 | ☐ | ☐ | 6. 10 to 49 | ☐ | ☐ | 6. 10 to 49 | ☐ |
| ☐ | 7. 1 to 9 | ☐ | ☐ | 7. 1 to 9 | ☐ | ☐ | 7. 1 to 9 | ☐ |
| ☐ | 8. none | ☐ | ☐ | 8. none | ☐ | ☐ | 8. none | ☐ |

## 6. What is your scope and involvement in purchasing decisions for network products and services for your enterprise?

**A. Scope** (check one only)

1. ☐ Corporate/Enterprise
2. ☐ Department
3. ☐ None

**B. Involvement** (check ALL that apply)

1. ☐ Create Network Strategy
2. ☐ Recommend/Specify
3. ☐ Approve
4. ☐ Evaluate
5. ☐ Determine the Need
6. ☐ None

## 7. What is the estimated number of employees at your location/in entire organization?

(check ONE in each section)

**A. At your location:**

1. ☐ Over 20,000
2. ☐ 10,000 – 19,999
3. ☐ 5,000 – 9,999
4. ☐ 2,500 – 4,999
5. ☐ 1,000 – 2,499
6. ☐ 500 – 999
7. ☐ 250 – 499
8. ☐ 249 or less

**B. Entire organization:**

1. ☐ Over 20,000
2. ☐ 10,000 – 19,999
3. ☐ 5,000 – 9,999
4. ☐ 2,500 – 4,999
5. ☐ 1,000 – 2,499
6. ☐ 500 – 999
7. ☐ 499 or less

## 8. Please indicate the products/services that you are currently involved in purchasing or plan to purchase:

(check ALL that apply)

A. Currently involved in purchasing  B. Plan to purchase

INTERNET/INTRANET

☐ 01. ☐ Internet Services/Web Hosting
☐ 02. ☐ Firewalls/Security/Encryption
☐ 03. ☐ Web Servers/Software
☐ 04. ☐ Web Servers/Hardware
☐ 05. ☐ TCP/IP Software
☐ 06. ☐ Management/Monitoring Software
☐ 07. ☐ Voice/Video Over IP
☐ 08. ☐ VPN Equipment/Services
☐ 09. ☐ Legacy Integration Tools (Web to Host)
☐ 10. ☐ Web Development Tools (JAVA, ActiveX, etc.)
☐ 11. ☐ Push Technology
☐ 12. ☐ Web Browsers
☐ 13. ☐ Intranet Applications/Groupware
☐ 14. ☐ Search/Retrieval Products (web crawler)
☐ 15. ☐ Electronic Commerce Tools
☐ 16. ☐ Web Authoring Tools
☐ 17. ☐ Other ______________

LOCAL-AREA NETWORKS/ INTERNETWORKING

☐ 18. ☐ Local-Area Networks
☐ 19. ☐ Network Operating System Software
☐ 20. ☐ Servers
☐ 21. ☐ Print Servers
☐ 22. ☐ Routers
☐ 23. ☐ ATM Switches
☐ 24. ☐ Token-Ring Switches
☐ 25. ☐ Ethernet Switches
☐ 26. ☐ Fast Ethernet
☐ 27. ☐ Gigabit Ethernet
☐ 28. ☐ Layer 3 Switches
☐ 29. ☐ Network Storage Devices (NASs, SANs)
☐ 30. ☐ LAN Storage/Backup
☐ 31. ☐ Optical Storage/Backup/Jukeboxes
☐ 32. ☐ Disk Storage/Backup
☐ 33. ☐ Tape Storage/Backup
☐ 34. ☐ RAID Storage/Backup
☐ 35. ☐ Network Test/Diagnostic Tools
☐ 36. ☐ Cables, Connectors, Baluns
☐ 37. ☐ UPS
☐ 38. ☐ Network Interface Cards (NICs)
☐ 39. ☐ Hubs
☐ 40. ☐ Intelligent Hubs
☐ 41. ☐ Stackable Hubs
☐ 42. ☐ Bridge/Router
☐ 43. ☐ SNMP Network Management
☐ 44. ☐ Gateways
☐ 45. ☐ Concentrators/Repeaters
☐ 46. ☐ Other (please specify) ______________

COMPUTERS/PERIPHERALS

☐ 47. ☐ Thin Clients/Network Computers (NCs)
☐ 48. ☐ Laptops/Notebooks/Sub-Notebooks
☐ 49. ☐ Micros/PCs
☐ 50. ☐ Minis
☐ 51. ☐ Mainframes
☐ 52. ☐ Workstations
☐ 53. ☐ Printers/Network Printers
☐ 54. ☐ CD-ROM/DVD
☐ 55. ☐ Fax/Modem Boards
☐ 56. ☐ Memory/Chips/Boards/Cards
☐ 57. ☐ Other ______________

REMOTE/WIRELESS COMPUTING

☐ 58. ☐ Remote Access Products
☐ 59. ☐ Remote Access Services
☐ 60. ☐ PDAs
☐ 61. ☐ PCMCIA Devices
☐ 62. ☐ Wireless Data Equipment/Services
☐ 63. ☐ Cellular Equipment & Services
☐ 64. ☐ Other (please specify) ______________

SOFTWARE/APPLICATIONS

☐ 65. ☐ Network Management
☐ 66. ☐ Systems Management
☐ 67. ☐ Security
☐ 68. ☐ Communications Software
☐ 69. ☐ Terminal Emulation
☐ 70. ☐ Operating Systems
☐ 71. ☐ Applications Development Tools
☐ 72. ☐ Database Management/ RDBMS
☐ 73. ☐ Groupware
☐ 74. ☐ Workflow
☐ 75. ☐ EDI
☐ 76. ☐ E-mail
☐ 77. ☐ Desktop Videoconferencing
☐ 78. ☐ Imaging
☐ 79. ☐ Suites/Server Suites (Back Office, etc.)
☐ 80. ☐ Middleware
☐ 81. ☐ Document Management
☐ 82. ☐ Site Metering Tools
☐ 83. ☐ Computer Telephony Integration (CTI)
☐ 84. ☐ Data Warehousing
☐ 85. ☐ Anti Virus Software
☐ 86. ☐ Multimedia
☐ 87. ☐ Yr. 2000 Conversion Software (Y2K)
☐ 88. ☐ Helpdesk
☐ 89. ☐ Web Based Management Tools
☐ 90. ☐ Directory Services
☐ 91. ☐ Other (please specify) ______________

WIDE-AREA NETWORK EQUIPMENT & SERVICES

☐ 92. ☐ 56 Kbps Modems
☐ 93. ☐ Under 56 Kbps Modems
☐ 94. ☐ Cable Modems
☐ 95. ☐ Asynchronous Transfer Mode (ATM)
☐ 96. ☐ Frame Relay Equipment/Services
☐ 97. ☐ ISDN Equipment & Services
☐ 98. ☐ FT-1/T-1/T-3 Multiplexers/Services
☐ 99. ☐ xDSL Services/Products
☐ 100. ☐ Diagnostic/Test Equipment
☐ 101. ☐ DSU/CSU
☐ 102. ☐ PBXs
☐ 103. ☐ Videoconferencing
☐ 104. ☐ Leased Lines
☐ 105. ☐ Switched Data
☐ 106. ☐ Virtual Private Networks (VPN)
☐ 107. ☐ FRADs
☐ 108. ☐ Managed LAN/Router Services
☐ 109. ☐ Other ______________
☐ 110. ☐ Outsourcing/Systems Integration Services
☐ 111. ☐ Education/Training Services
☐ 112. ☐ None of the above (1–111)

## 9. Please indicate the platforms that are currently installed/planned:

(check ALL that apply)

A. Currently installed  B. Planned for purchase

NETWORK PROTOCOLS

☐ 01. ☐ TCP/IP
☐ 02. ☐ IPv6
☐ 03. ☐ SNA
☐ 04. ☐ Novell IPX/SPX
☐ 05. ☐ APPC/APPN/LU 6.2
☐ 06. ☐ NETBIOS
☐ 07. ☐ NFS
☐ 08. ☐ SNMP
☐ 09. ☐ Other ______________

LAN ENVIRONMENT

☐ 10. ☐ Gigabit Ethernet
☐ 11. ☐ Switched Ethernet
☐ 12. ☐ Fast Ethernet (100 Megabit Ethernet)
☐ 13. ☐ Ethernet
☐ 14. ☐ ATM
☐ 15. ☐ Token Ring/Token Ring Switching
☐ 16. ☐ IP Switching
☐ 17. ☐ Layer 3 Switching
☐ 18. ☐ FDDI
☐ 19. ☐ 100Base-T
☐ 20. ☐ 10Base-T
☐ 21. ☐ Fibre Channel
☐ 22. ☐ Other ______________

NETWORK OPERATING SYSTEM

☐ 23. ☐ Windows NT
☐ 24. ☐ Windows NT/Advanced Server
☐ 25. ☐ Novell IntranetWare
☐ 26. ☐ Novell (NetWare 5.X)
☐ 27. ☐ Novell (NetWare 4.X)
☐ 28. ☐ Novell (NetWare 2.X, 3.X)
☐ 29. ☐ Microsoft (LAN Manager)
☐ 30. ☐ Banyan (VINES)
☐ 31. ☐ IBM (Server)
☐ 32. ☐ Other (please specify) ______________

COMPUTER OPERATING SYSTEM

☐ 33. ☐ NT Server
☐ 34. ☐ NT Workstation
☐ 35. ☐ Unix/Xenix/AIX/SCO
☐ 36. ☐ Solaris
☐ 37. ☐ Windows
☐ 38. ☐ Windows 95
☐ 39. ☐ Windows 98, .9x
☐ 40. ☐ DOS
☐ 41. ☐ DS/2, OS/2 Warp
☐ 42. ☐ IBM MVS/VM/VSE
☐ 43. ☐ Digital VMS
☐ 44. ☐ Macintosh
☐ 45. ☐ Other ______________
☐ 46. ☐ None of the above (1–45)

## 10. Which of the following Servers/Clients do you have installed/planned at your location?

(check ALL that apply in each column)

| | A. Servers | | B. Clients | | A. Servers | | B. Clients |
|---|---|---|---|---|---|---|---|
| Power PC | ☐ | 01. | ☐ | 486, 386, 286 | ☐ | 07. | ☐ |
| Power Mac | ☐ | 02. | ☐ | Sun Sparc | ☐ | 08. | ☐ |
| Mac Other | ☐ | 03. | ☐ | Risc | ☐ | 09. | ☐ |
| Multiprocessor Servers | ☐ | 04. | ☐ | Alpha | ☐ | 10. | ☐ |
| Pentium II (PII) | ☐ | 05. | ☐ | Other | ☐ | 11. | ☐ |
| Pentium/Pentium Pro | ☐ | 06. | ☐ | | | | |

## 11. Which of the following hardware platforms are installed/planned in your company?

(check ALL that apply)

**A - Mainframes (Large Scale)**

1. ☐ IBM
2. ☐ Amdahl
3. ☐ Cray
4. ☐ Hitachi
5. ☐ Unisys
6. ☐ Other ______________

**B - Minis (Midrange)**

1. ☐ IBM RS/6000
2. ☐ IBM AS/400
3. ☐ Digital
4. ☐ Tandem
5. ☐ Unisys
6. ☐ AT&T GIS
7. ☐ H-P
8. ☐ Data General
9. ☐ Other ______________

**C - Workstations**

1. ☐ Sun Microsystems
2. ☐ Silicon Graphics
3. ☐ Digital
4. ☐ H-P
5. ☐ IBM
6. ☐ Other ______________

## 12. What is the estimated gross revenue of your entire company/institution?

(check ONE only)

01. ☐ $20 billion or more
02. ☐ $10 billion to $19.9 billion
03. ☐ $1 billion to $9.9 billion
04. ☐ $500 million to $999.9 million
05. ☐ $100 million to $499.9 million
06. ☐ $50 million to $99.9 million
07. ☐ $10 million to $49.9 million
08. ☐ $5 million to $9.9 million
09. ☐ $4.9 million or less
10. ☐ None of the above

## 13. For which areas outside of North America do you have purchase influence?

(check ALL that apply)

1. ☐ Europe  2. ☐ Asia  3. ☐ South America  4. ☐ Australia  5. ☐ Middle East  6. ☐ None

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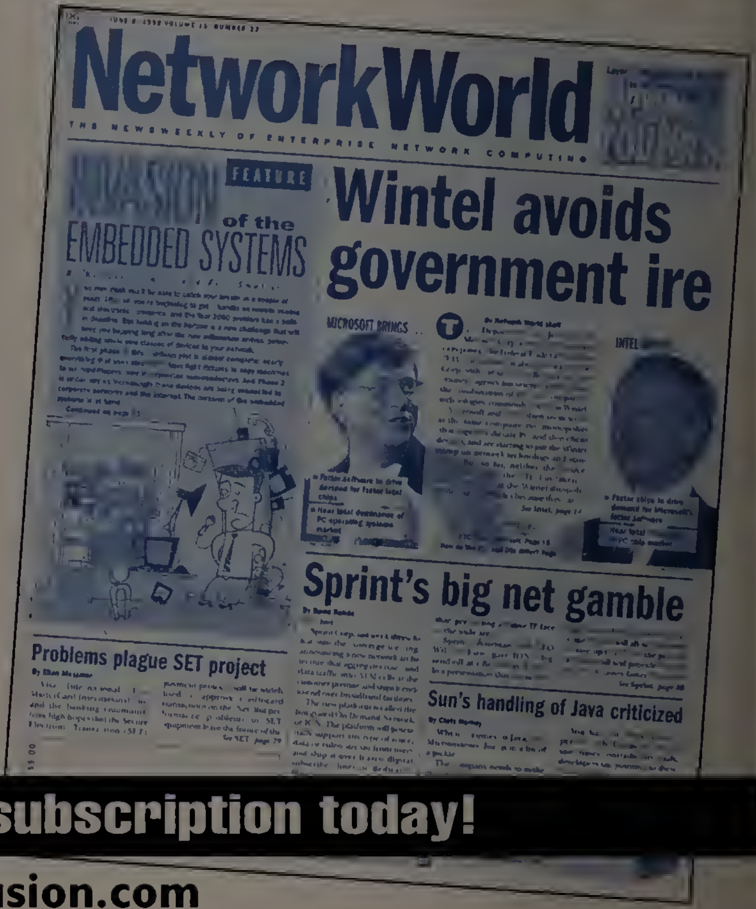

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## Briefs

**Visionael Corp.** *this week will release a new version of its* **Visionael Netsuite of network design and management software.**

*In addition to performance improvements, Version 4.0 periodically updates its network information through network management platforms, including Hewlett-Packard's OpenView, Cabletron's Spectrum and the Tivoli's Tivoli Enterprise.*

*Pricing starts at $12,000.*

*✆ Visionael: (800) 356-3187*

**OpenConnect Systems** *last week announced approval from the U.S. Department of Commerce to* **export OC://WebConnect Pro with 128-bit encryption,** *the highest level of technology available for secure Internet transactions.*

*OC://WebConnect Pro will provide U.S. companies and their foreign subsidiaries with secure Internet access to data located on mainframes. The encryption technology is available immediately as a free upgrade for OC://WebConnect Pro users.*

*The 128-bit encryption will be automatically included in the next version of the product, which is targeted for release before year-end.*

*✆ OpenConnect: (972) 484-5200*

**Nortel Networks** *has announced the release of its Bay Networks'* **Nautica 250 SOHO/Enterprise ISDN Router.** *The Nautica 250 sports a single Ethernet port, a single ISDN Basic Rate Interface and two analog ports. It routes IP and IPX traffic. The Nautica 250 costs $750 and is available now. Nortel's rival Cisco also recently announced a line of small office/home office routers — the Cisco 800 series — that cost from $799 to $899.*

*✆ Nortel Networks: (408) 988-2400*

# Paradyne software monitors frame nets

**By Tim Greene**

*Largo, Fla.*

New software from Paradyne could help users keep closer tabs on their frame relay service providers.

Paradyne's Enhanced FrameSaver Service Level Verification (SLV) software keeps track of packet loss and delay across frame relay links and measures that loss against the customer's service-level agreements, the company says.

The software is loaded on Paradyne FrameSaver 9624, 9124 and 9580 DSU/CSU hardware and collects data about traffic moving in and out of each site on a network.

Previous frame-monitoring tools measured lost frames but did not say whether those losses violated the rock-bottom bandwidth guaranteed by a contracted committed information rate (CIR). CIR is the bandwidth the customer is guaranteed to receive all the time, Paradyne representatives say.

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A typical frame relay service will accept frames above the CIR, but those excess frames could be dropped if the network becomes congested.

The capability to measure frames lost within the CIR, which Paradyne calls TruPut, augments Paradyne's existing monitoring software, OpenLane FrameSaver. OpenLane measures network delay and availability on a virtual-circuit-by-virtual-circuit basis.

Being able to verify that information independently can be important, especially when the customer is relying on the service provider to supply reports on network performance, according to Rick Glasberg, manager of data communications for the Commonwealth of Massachusetts.

"I think FrameSaver SLV will be a useful tool to see what's going on in the Bell Atlantic network," Glasberg says. The state bases its 350-node frame relay network largely on circuits provided by Bell Atlantic.

Currently, Bell Atlantic's reports are not detailed enough for Glasberg's purposes, he says. He does request more specific reports, but it takes more time to get them.

Glasberg already generates some reports using Paradyne's DCE Manager element management software in conjunction with Concord Communications' Network Health software. While Glasberg will use FrameSaver SLV to collect information from his network, the same software could be used by service providers to generate reports.

Those reports could then be posted on secure Web servers so customers could get near real-time performance details about their networks.

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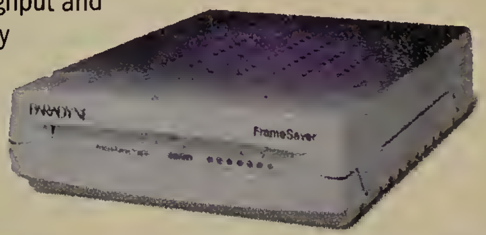
☑ Details availability, throughput and delay for each frame relay virtual circuit.

☑ Allows service providers to share network performance statistics with customers.



Enhanced SLV Reports with TruPut will be available in December as part of Paradyne's OpenLane FrameSaver management suite. The product will cost $18,985 for Unix operating systems or $10,685 for Windows.

✆ Paradyne: (813) 530-2000

# HiFive eases Cisco router configuration

*RouteAssistant brings Java simplicity to cryptic IOS tasks.*

**By Jim Duffy**

*Los Altos, Calif.*

New software from start-up HiFive Networks is designed to improve the efficiency, accuracy and safety of configuring Cisco routers in campus and mid-size enterprises.

The firm's RouteAssistant software performs automated audit, backup and restoration of Cisco router configurations, and offers online configuration via a browser for tasks normally performed through the text-based Cisco IOS command line interface (CLI).

RouterAssistant is a Java application that runs on Windows NT servers and Windows 95 clients. Next year RouterAssistant will run on Unix servers, such as Solaris and HP-UX, HiFive representatives say. The package supports Microsoft Internet Explorer and Netscape Navigator browsers.

Bundled with RouterAssistant are graphical managers for Cisco 2500, 4000, 4500 and 4700 series routers. Graphical managers for other Cisco routers, such as the 3600 and 7000 series, will be available in 1999, according to HiFive.

RouterAssistant automatically logs configuration changes for network auditing and troubleshooting. Users say this is a key feature of the product.

"When you log in to the router, whatever command you issue to it, RouterAssistant will log it and allow you to roll it back," says Dennis Wong, senior systems manager at nVidia, a maker of 3-D graphics processors in Santa Clara, Calif. "This feature is desirable in case you make a goofy change and it doesn't work."

Because RouterAssistant is a Java application, users can access configuration files from anywhere, at anytime. This lets administrators respond quickly to network problems whether they are on or off campus.

Cisco also offers a Web-based CLI for router configuration, but users say it is limited and cumbersome.

"I have not had a lot of success with that. I tend to shy away from some of their things," says Ronnie Cusmano, assistant vice president at a financial services firm in New York. "I don't like the way Cisco Resource Manager looks, and I don't like the way it feels. This Java-based approach is much more comprehensive."

RouterAssistant can run as a stand-alone application or as an integrated package with Cisco's new CiscoWorks2000, a Web-based suite of management applications for Cisco routers and switches.

RouterAssistant will be available in December at a price of $995 for five routers.

HiFive was founded in September by executives and engineers from Newbridge Networks, UB Networks, Hewlett-Packard and other companies. Ron Morita, a former UB network management executive, is HiFive's president and CEO.

✆ HiFive: (650) 948-8896

# IBM slashes network gear prices

**By Marc Songini**

*Research Triangle Park, N.C.*

When it comes to network gear, no one would accuse IBM of being a low-cost price leader, but the company has slashed the prices for key LAN and ATM switching components.

IBM recently announced a slew of price cuts — ranging from hundreds to thousands of dollars — for the 8260 Nways multiprotocol switching hub and 8265 Nways ATM switch, and the connectivity modules that go with them (see graphic). The 8260 and 8265 typically anchor campus LAN and ATM networks.

The discounted IBM products include Ethernet modules, LAN and ATM switch modules, and I/O cards for the 8260/8265. The price cuts vary, ranging, for instance, from $795 for the one-port ATM WAN module to $12,000 for video distribution modules for both the 8260 and the 8265.

With this move, IBM may succeed in reaching those few users who want ATM in their networks to handle quality of service for their multimedia applications, says Tom Nolle, president of CIMI Corp., a consultancy in Voorhees, N.J.

"This won't set the world on fire, but it will guarantee IBM better penetration in markets that are ATM-centric," he says.

### Under fire

Analysts contrast IBM's moves with those by Cisco, which recently has come under fire for keeping its network equipment prices high. For example, at the recent Gartner Group Symposium ITxpo 98, analysts lambasted Cisco for being unwilling to reduce its 50% to 60% profit margins — unlike its competitors, which are more willing to make deals.

**IBM's price cuts**

**Here are some of the 8260/8265 products IBM is slashing prices on:**

| Product | Old Price | New Price |
|---|---|---|
| 8260 36-port switching module | $4,090 | $2,870 |
| 8260/8265 Video distribution module | $20,000 | $8,000 |
| 8260 20-port 10BaseFB/FL | $18,895 | $7,560 |

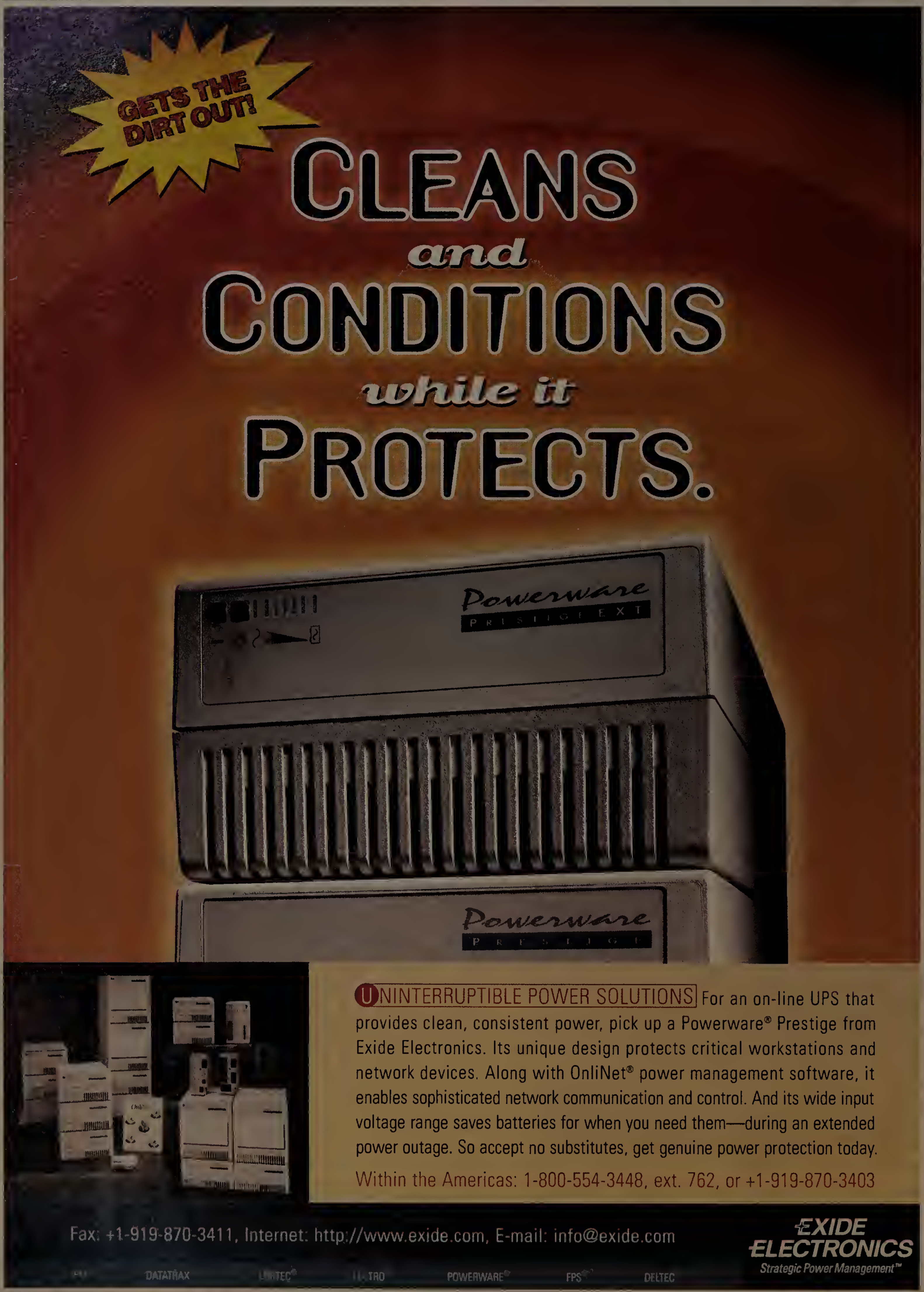
But IBM's goal is to save face in a highly competitive market. According to International Data Corp., IBM only had 1.9% of the revenue in the worldwide LAN ATM switch market in 1997, garnering $15 million from 24,000 ports shipped. Contrast that with FORE Systems, which garnered $191 million from 105,000 ports, IDC says.

This is a fairly routine way of keeping the products competitive with other vendors', according to IBM's Networking Hardware Division (NHD).

"We continue to monitor products and make sure they're competitive in the marketplace," says Tim McChristan, vice president of sales and marketing at NHD.

He says IBM tries to stay competitive through all its brands and that customers will vote with their dollars.

✆ IBM: (800) 426-2255



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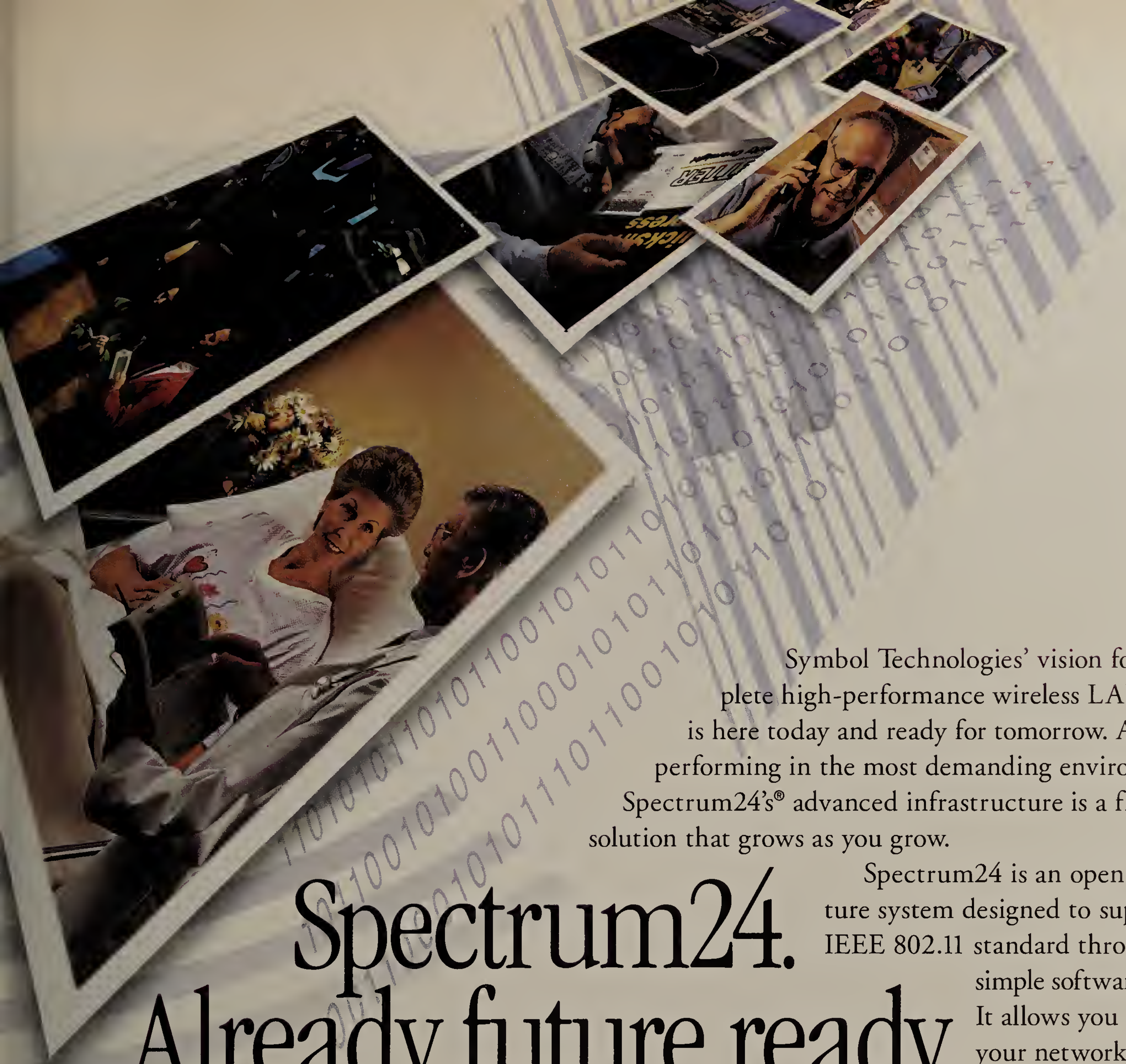

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**INTERNETWORKING MONITOR**

# User forum focuses on issues

Users. We tend to refer to them as a generic, monolithic group. In reality, there are many different types of users.

Bleeding-edge users adopt net technology before it's fully baked; cutting-edge users learn from the experiences of their bleeding-edge brothers; mainstream users wait to implement new technology until it's proven; and straggling users get around to using technology when they see fit.

No matter what category best describes your network IS operation, understand that the various future Internet initiatives now building momentum are collectively destined to become the Next Generation Internet (NGI). And ultimately that will have an enormous impact on how we network for a long time.

Sure, we have Internet2. And the Feds have their NGI Initiative. Even states such as California, New York, Virginia and Florida have gotten into the act with local and regional projects such as Cal-REN 2, Southern Crossroads and others.

Though less well-publicized, some large corporations are initiating efforts of their own. But therein lies the rub. Despite all of these individual NGI-related efforts, users have no assurance that these various, sometimes overlapping efforts will enable the advanced applications they build to run across these networks when they interconnect in the future.

What we really need is a unified user voice to inform component suppliers and the builders of disparate NGI infrastructures about user application requirements. But for this cry to be heard, it needs to come from users. A lot of users.

**Kevin Tolly**

Over the past several months, at the urging of users, application developers and infrastructure providers, The Tolly Group coordinated efforts to create a formal entity now known as the NGI Forum. The goal of the organization is to encourage discourse among the corporate, government and education pioneers implementing next-generation Internets.

The forum also will communicate application requirements to component suppliers and builders of NGI networks, as well as to standards bodies and other groups.

That said, I'm inviting you to a historic event on Dec. 16 in Chicago, where you'll not only get to view firsthand the benefits derived from interconnected NGI networks, but you'll also get to network with your peers to learn about their own NGI experiences.

To kick things off, Argonne National Laboratory in suburban Chicago is hosting the day-long meeting; you'll get to see how advanced applications such as Argonne's CAVE (Computer Automated Visual Environment) will make use of NGI nets. And you'll hear from industry speakers about the significance of the NGI Forum as a conduit for NGI information exchange.

To learn more about the event, go to www.ngiforum.org.

*Tolly is president of The Tolly Group, a strategic consulting and independent testing firm in Manasquan, N.J. He can be reached at (732) 528-3300, ktolly@tolly.com or www.tolly.com.*

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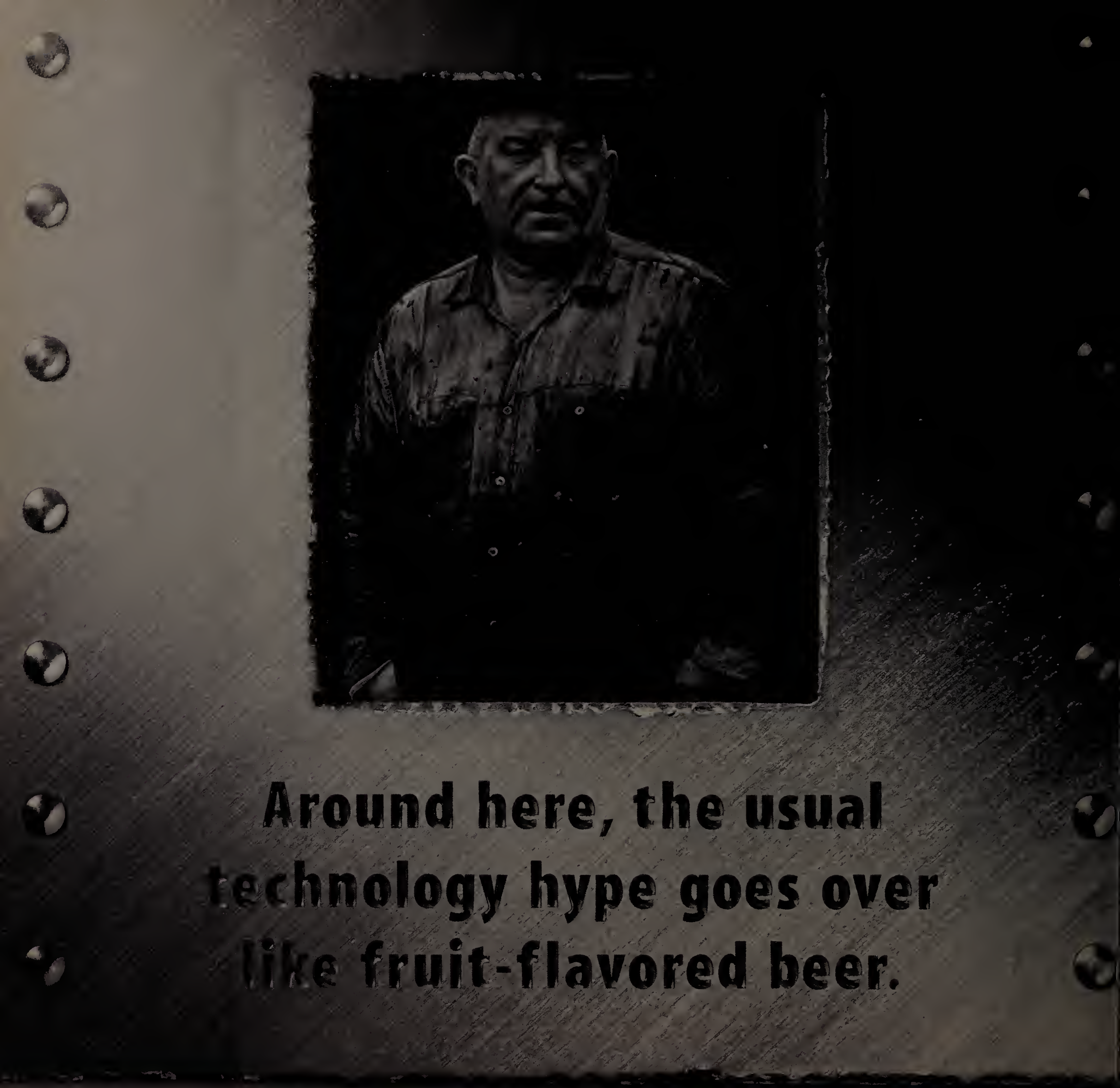
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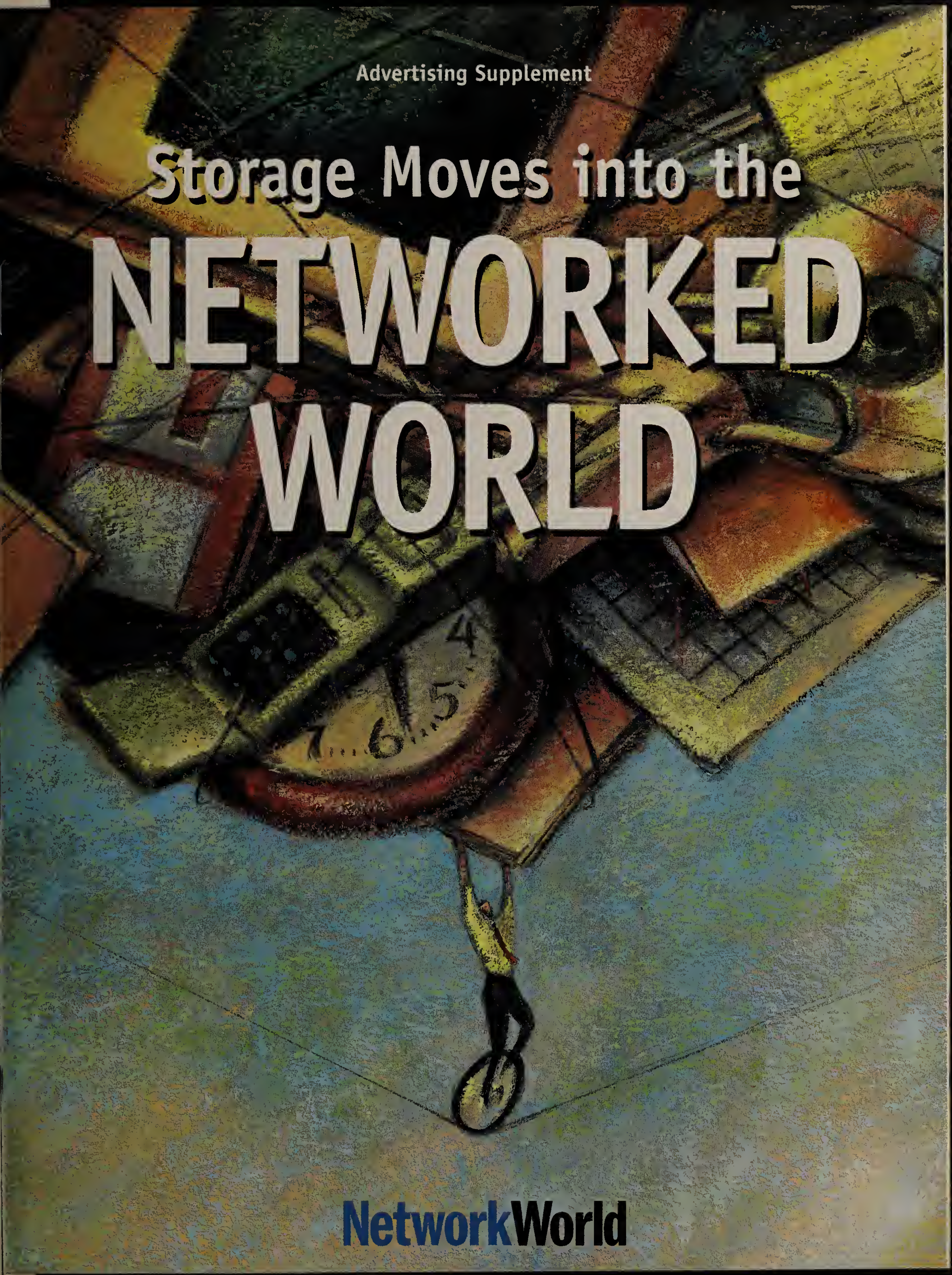

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# Storage Moves into the Networked World

***Increasing demand to access stored data, and the latest storage concepts such as NAS and SAN, create new challenges for Network IS professionals.***

**BY ALAN RADDING**

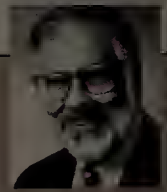
The downward trend in storage costs may have storage managers jumping with joy, but Network IS professionals can't be faulted for wondering if the lower costs amount to too much of a good thing. Steadily falling storage prices are triggering a storage buying spree. This increases the workload for Network IS professionals — in terms of both network management and bandwidth capacity planning — as they scramble to maintain the network links that connect the additional terabytes of low-cost storage.

"By increasing accessibility to stored data, you make it easier for more people to get information. The net effect is more traffic," observes Farid Neema, president, Peripheral Concepts Inc., Santa Barbara, Calif. And more traffic means more work for the Network IS professional.

According to International Data Corp. (IDC), Framingham, Mass., the total installed terabytes of storage worldwide is growing from 20,000 terabytes in 1993 to 3 million terabytes worldwide by 2000.

Fueling this storage explosion is the plunging cost of storage, which fell to $0.45 per megabyte in 1997 and is expected to keep dropping. By 2000, IDC projects a $0.07 per megabyte cost.

At this point, Network IS professionals haven't really felt the impact on their networks of increased storage volume per se. However, they have been wrestling with the increased application traffic, the growing numbers of network users due to the Internet, and new data types, such as multimedia, that are driving the demand for more network bandwidth as well as more storage. The increased demand for access to stored data and new storage concepts, such as network attached storage (NAS) and storage area networks (SANs), threaten to turn storage access into the next big headache for the Network IS professional. "We're seeing more and more of our mid- to large-tier customers focusing on gaining control over the storage management operations across all platforms, from the mainframe to distributed platforms and often



*"Organizations will have more files and more gigabytes of storage, but they won't necessarily have to hire more people to manage it."*

**–Robert Gray, Research Manager,**

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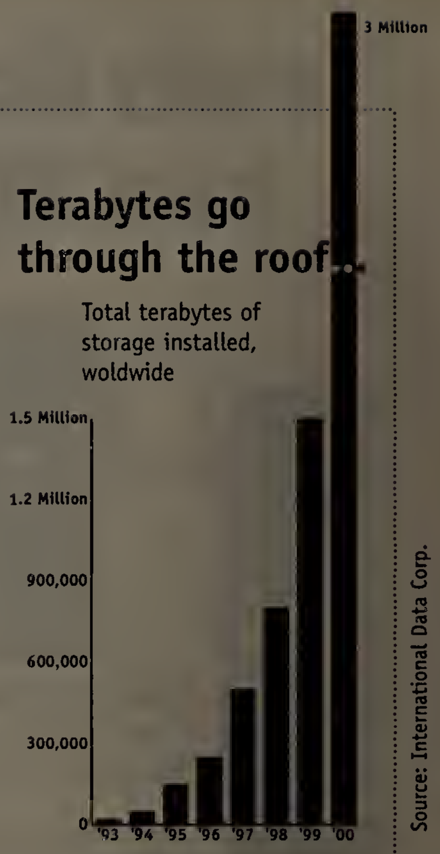
Terabytes go through the roof...

Total terabytes of storage installed, woldwide

Source: International Data Corp.

out to desktops and remote users," says Lisa Carlin, market director, enterprise storage management, InRange Technologies Corp., Mount Laurel, N.J.

## NAS, SAN Consolidate Storage

NAS and SANs are both ways to make large amounts of shared storage available to multiple application servers. NAS refers to situations where the storage subsystems and the corresponding file system are connected over the same network to the application servers. The network, in effect, sits between the file system with its storage and the application server. With SAN, the file system remains with the application servers while the network connects a secondary data storage subsystem. In effect, the SAN is a subnet, separated from the primary network containing application servers and the file system.

The growth of networks of computers does indeed lead to the sharing of secondary storage data among multiple application servers, which increases the network load, notes Robert Gray, research manager, storage systems, IDC. But the relationship is not straightforward, he warns.

"Organizations will have more files and more gigabytes of storage, but they won't necessarily have to hire more people to manage it," Gray contends. NAS and SAN represent ways to consolidate storage at the enterprise level, where it can be managed with a single set of software tools. Once consolidated, "the number of gigabytes of storage that one manager can handle goes up enormously," he adds.

While consolidated storage sounds great for the storage manager, it doesn't necessarily do anything for the Network IS professional. NAS servers, in particular, represent more devices sitting on the network. "It would be nice if they were managed like any other server on the network," suggests Anders Lofgren, industry analyst, Giga Information Group, Cambridge, Mass. Since NAS servers also are being backed up over the same network, however, the amount of bandwidth they consume would likely be more than with typical servers.

It is naive to think that increased storage won't change network management. "Network management will change, but not, we hope, by adding more work," says Peripheral Concepts' Neema. Instead, he sees storage management increasingly integrated with network and system management. "The trend is toward automating it all, rather than asking a Network IS professional to perform more tasks," he observes.

Aside from basic network management issues, bandwidth capacity planning is a concern. Of NAS and SAN, SAN holds the most immediate promise of reducing network traffic. "The SAN would take traffic off the production network over time," notes Lofgren. For instance, backups can be contained within the SAN, eliminating the need to mirror or otherwise copy large amounts of data across the production network.

## Suprising Solution

A potentially bigger storage-related bandwidth issue, suggests IDC, is not the backing up of storage servers over the network, but the increasing amounts of wide area network bandwidth consumed by the Internet Protocol (IP) when it repeatedly transmits the same file over the network. The surprising IDC solution: a type of distributed local storage called Internet storage cache. Although this approach flies in the face of efforts to consolidate storage at the enterprise level, it is based on an IDC analysis that shows the cost of storage dropping faster than the cost of bandwidth.

With local Internet cache, Gray explains, each local server maintains a cache of data that has previously been transmitted over the network, reducing the need to retransmit it.

Whether NAS and SAN or Internet caches relieve bandwidth congestion cannot be determined at this point. What can be seen today is the seemingly contradictory nature of local cache and NAS and SAN, the former highly distributed, the latter highly centralized. These seemingly conflicting solutions may yet turn out to be complementary.

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*Alan Radding (radding@mediaone.net) is a freelance business and technology writer based in*

*visionary.*

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*Storage area networks seem like a good idea on paper – but how do you get there from here?*

# Five Steps to SAN-ity

BY LENNY LIEBMANN

Nothing stays the same in this business for long. You operate on the assumption that storage devices get attached to the server that generates the data. After all, that's the way you've always done things. Then along comes someone with a bright idea called a storage area network (SAN).

SANs, you're told, make more sense than server-specific storage for enterprises with multiple applications that generate business-critical data. And some of the arguments are pretty compelling.

A SAN is generally defined as a set of shared storage resources that are logically (and usually, though not necessarily, physically) centralized. Unlike conventional server-based storage, the storage devices in a SAN are architected, used, and managed commonly across multiple applications. And, unlike network attached storage (NAS), a SAN's physical network – typically Fibre Channel or SCSI – connects directly to the buses of the servers it supports.

There are several purported advantages to using a SAN. One obvious one involves the potential economies of scale that can be gained by pooling storage software and equipment across multiple applications. Instead of buying four 25Gb RAID boxes, for example, you can buy one 100Gb device.

Another promised benefit of SAN architecture is improved fault tolerance. With multiple storage devices attached to multiple servers, it's a fairly straightforward matter to provision redundant links that prevent a single point-of-failure.

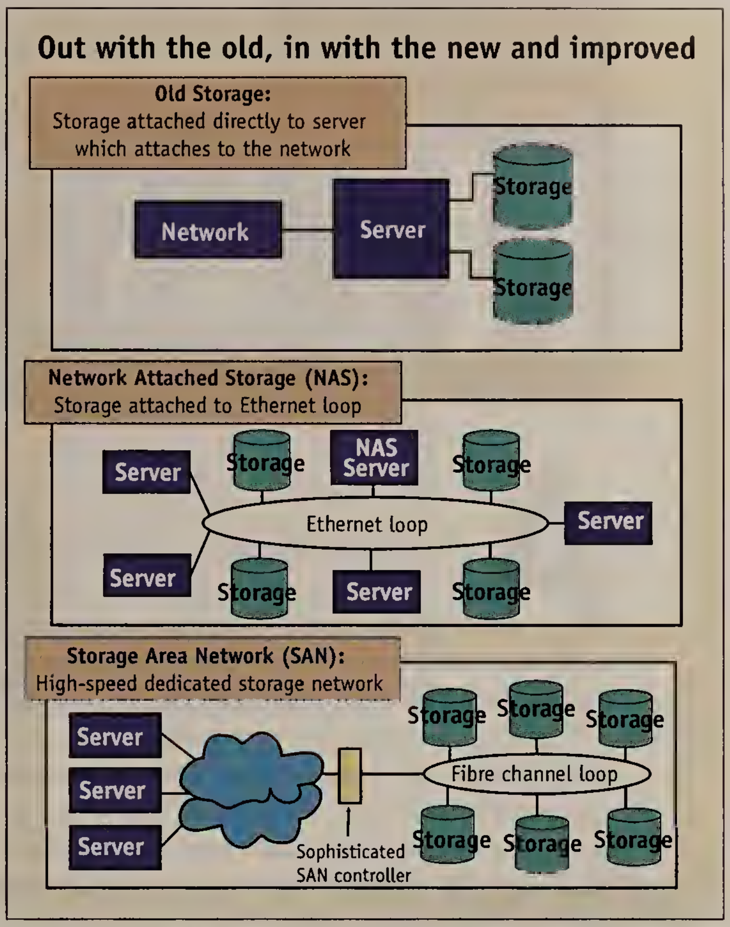
The third basic justification for building a SAN is its scalability. In a SAN, new devices can be made accessible to every SAN-connected server by simply connecting them to an open SAN hub port. This provides a very flexible and – theoretically – limitless means of adding capacity on an as-needed basis. That's a very appealing proposition for organizations contemplating multi-terabyte deployments – such as data warehousing for large-scale retailers.

One early implementer – Minneapolis-based US Bancorp – found that a SAN could also be useful for large-scale data migration when it acquired another bank. "When you're doing a big migration, files become available over time, and you usually have to wait until the last one is done and shipped before you can use them," explains Mark Sobotka, the bank's vice president and general manager of technical services. "With the SAN, we were able to receive files at our site and start processing data while they were still doing conversions over there. So customers got access to their data and their funds much more quickly."

## Castles in the SAN

SAN implementations are still few and far between today. According to Farid Neema, president of Peripheral Concepts Inc., a Santa Barbara, Calif.-based consultancy specializing in data storage issues, there are two main reasons for this. First, the idea of a SAN is relatively new, so very few users have actually completed true SAN projects.

Second, there is no single-vendor SAN solution. Different vendors offer different pieces of the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Storage
Server
Server
Server
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Storage
Storage

**The choice of a NAS or SAN is really a matter of scale. Both are responses to the massive need for distributed storage in the installed base, and the increasing difficulty of managing it.**

SAN puzzle: storage hardware, Fibre Channel hubs and switches, and software to manage pooled resources. "It's like what we went through with SCSI years ago," says Neema. "All the systems vendors are working on SAN for their own systems, but we don't have a lot of deployments in real heterogeneous environments."

In addition, says Scott McIntyre, business line manager for storage networking at Legato Systems, Inc., Palo Alto, Calif., "SANs are much more complex than traditional storage environments, and scalability will require more sophisticated management capabilities. Data protection, hierarchical storage management, media management, and policy management all become even more critical functions."

However, Neema is bullish on SAN technology's long-term prospects. He sees it being adopted in its early stages in specialized markets, such as multimedia and publishing, where storage needs are intense and market-specific vendors can offer complete solutions. He also predicts that major storage vendors will be announcing new SAN gear over the next couple of quarters.

So, assuming that you're ready to at least launch an investigation into implementing a SAN in your organizations, what should your next steps be? Here are five steps based on the suggestions of several SAN vendors and industry observers:

***Carefully assess your SAN storage needs and objectives.*** Yes, SAN storage is eminently scalable, but it's still important to plan for growth. If you run out of ports on your Fibre Channel hub, it will cost you more to add another device than it would have to get a bigger hub to start with.

***Determine the physical topology of your SAN.*** While physical co-location can be useful to further reduce management and administrative costs, it's not a requirement. In fact, one of the benefits of using Fibre Channel is that the distances you can cover are tremendous – as much as 10 kilometers.

***Plan for migration logistics and costs.*** If you have newer server-attached storage devices that support Fibre Channel or your other SAN transport-of-choice, you'll be able to convert them. Otherwise, you'll have to come up with another use for your legacy storage equipment. You'll also need to maintain parallel systems during your change-over – especially since SAN technology has not proven itself in extensive field tests.

***Don't forget about backup.*** Just because you're using RAID devices in your SAN, that doesn't mean you can ignore disaster recovery issues.

***Shop for management tools carefully.*** As more devices are added to a SAN and more applications share it, management is likely to become a major headache. This is probably the biggest shortcoming in SAN technology today, and is likely to remain the biggest stumbling block to deployment in heterogeneous environments.

IT departments dealing with diverse, ever-increasing storage requirements would be well-advised to start looking into SAN technology and opening up a dialog with SAN vendors. But until standards are fully defined and tested – and until either acquisitions or partnerships deliver a one-stop solution – SANs will strictly be for companies where the benefits of highly scalable shared storage are worth a sizable investment in evaluation, engineering, and testing.

*Lenny Liebmann is a Highlands, N.J.-based consultant and writer specializing in the technology and business of networking and e-commerce.*

# Enterprise-Class Storage, NT Style

***Advances in the upcoming release of Microsoft NT 5.0 promise more robustness.***

**BY RANDALL D. CRONK AND LORI ROBAK**

As Microsoft Windows NT emerges as an enterprise standard, the storage function of NT-based data is gathering considerable attention – and generating numerous challenges for Network IS professionals.

"Companies are deploying NT servers at a rate that is almost unsupportable from an administration standpoint," says John McArthur, program director at International Data Corp., Framingham, Mass. "There needs to be ways to simplify the setup of NT servers and all the storage applications associated with NT."

Brian Smith, CEO of Crossroads Systems, Inc., an Austin, Texas-based manufacturer of networking and storage products, says that when it comes to storage, "Right now NT requires a lot of work. It has a shared 'nothing' environment."

Another storage problem that has proven vexing for NT administrators is scalability. "NT can only support two to four disk arrays – it needs to become more of an enterprise-type of software," states Ed Frymoyer, president of the consultancy emf Associates, Half-Moon Bay, Calif.

NT is clearly headed in that direction, in the short-term with storage advances in the upcoming 5.0 release, and in the longer term through a new alliance with Houston-based Compaq Computer.

When Compaq acquired Digital Equipment Corp., one question was whether Compaq would continue an alliance in which Digital transferred to Microsoft key innovations that first appeared in OpenVMS but which would eventually show up in NT – one of which, of course, was clustering, that precursor to storage networks. This issue now seems resolved. In September, Compaq signed another pact with Microsoft – to share not only OpenVMS technology, but also Digital Unix and Tandem NonStop Kernel.

Although details are sketchy, the agreement seems focused on enhancing NT's enterprise capabilities, chief among them storage network management. Key technologies include clusters, remote mirroring, and data and file partitioning.

In the more near term, "Windows NT 5.0 will be cognizant of Fibre Channel and storage area network features," says Crossroads' Smith. "It will be able to recognize more things and handle bigger storage. It will be able to understand simple name services and have a more hierarchical view of the world. This will give the manager a way of configuring storage needs."

NT 5.0 will also support multiple protocols, according to emf's Frymoyer. In addition, third parties, such as StorageTek, are already working on SAN components allowing users to link SANs and Windows NT. The fact that other NT heavyweights – including IBM, HP, Sequent, and Compaq – support StorageTek's products is a good reason to expect a favorable infrastructure for SAN to start taking shape next year.

For now, the bottom line on Windows NT enterprise storage seems to be this: It will happen, it will grow out of its clustering (i.e., NAS) heritage, and it will borrow heavily from technology partners and third parties.

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*Randall D. Cronk is a Boston-based freelance writer on information technology topics. Lori Robak is a freelance writer based in Hopkinton, Mass., covering high technology.*

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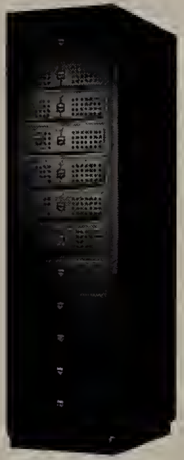

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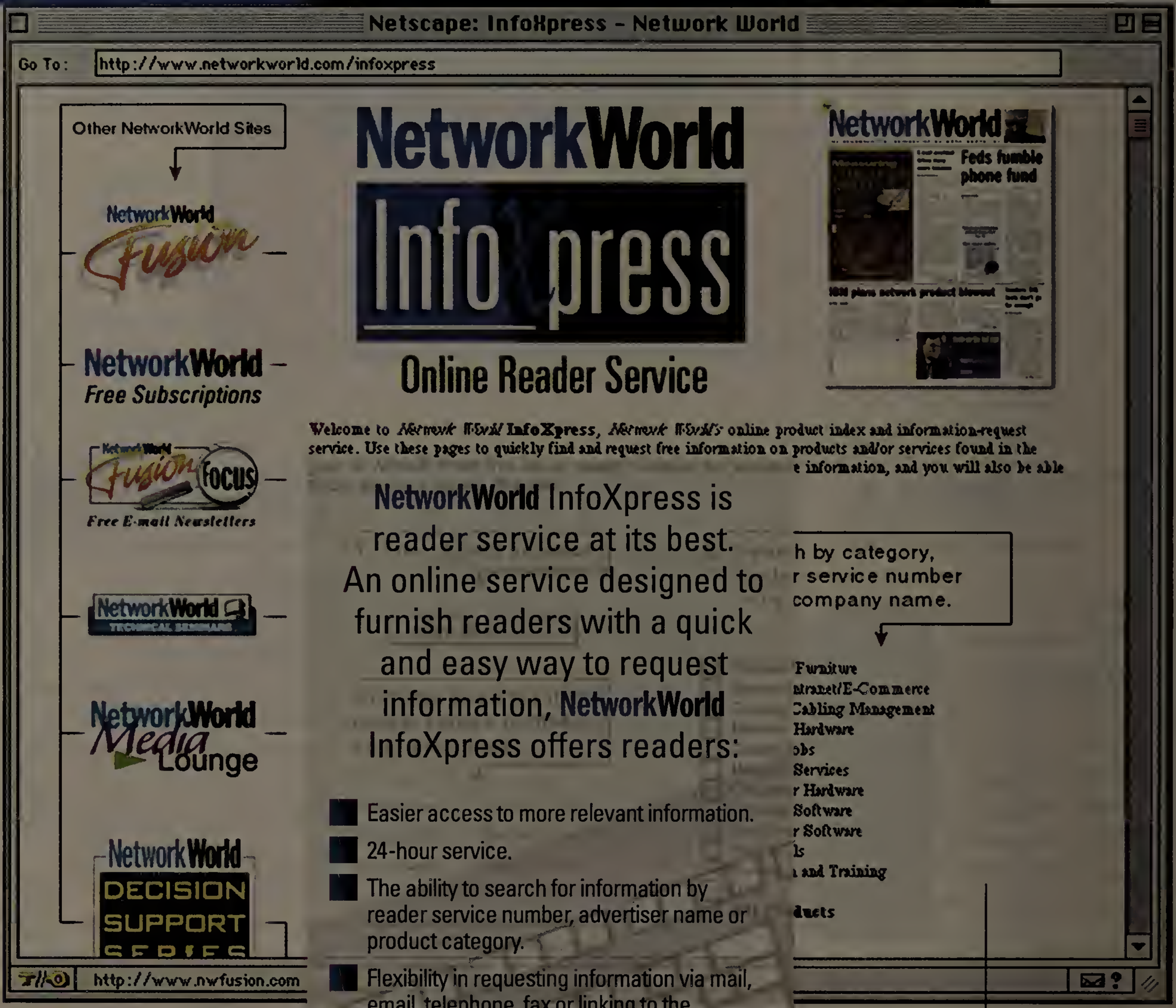
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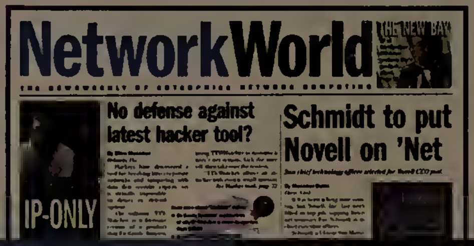
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*NAS and SAN promise to cut storage management costs, while reducing the tension between storage and distributed processing architectures.*

# Best *of Both* Worlds

BY RANDALL D. CRONK

Back in the bad old days of mainframe-centric computing, organizations derived important economic benefits from the fact that most of their computing resources were centralized. That was certainly true of storage—which remained easier to manage, less expensive to maintain, and cheaper to buy and deploy centrally, even after other aspects of computing had long been distributed throughout the enterprise.

Only now is that tension on its way to being resolved. New storage architectures – network attached storage (NAS) and storage area networks (SANs) – promise the best of both worlds: the economies of scale and management efficiency of centralized storage, plus the flexibility to match storage resources against distributed applications and users.

“There are two ways to lower the cost of storage,” says Robert Gray, IDC’s research manager of storage systems. “One is to put resources together in the same physical location; the other is to put them together in the same virtual location. The advantage of the new architectures is that you can buy built arrays in bulk at the most favorable cost per megabyte and allocate them [virtually] out to various servers as you need them. You can deploy the type of RAID and the type of performance that matches the application a little more easily. You also can have a single set of software tools to do the managing – which increases efficiency and lowers training costs.”

“Certainly the potential for cost reduction exists,” agrees Andres Lofgren, an analyst with Giga Information Group in Cambridge, Mass. “For one thing, you’ll have this big pool of storage that you’ll be able to reallocate from one device to another—which you can’t do today without physically moving storage. And because it’s in one big pool, you’re not watching 50 servers and 50 storage devices, logically speaking. Hopefully the management tools are there to monitor all that.”

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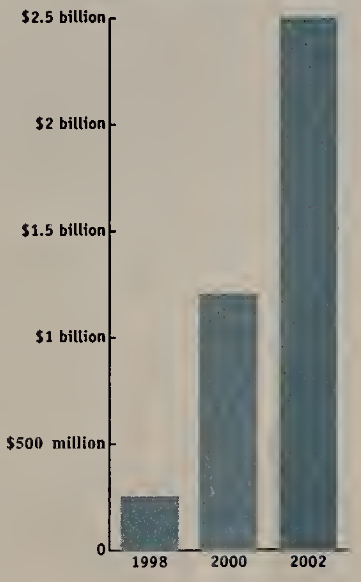
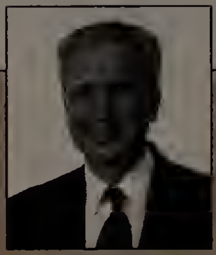
**Worldwide SAN spending**



Source: Dataquest

They’re not there yet—particularly for SANs, where interoperability among different types of file systems is a bigger issue than for NAS, where storage is simply being added to an existing file system. That’s just one factor organizations must consider when choosing between the two approaches.

Other critical differences are these: In NAS, storage arrays are attached via a high-speed



> *"Availability, scalability, and performance are what customers are looking for, and that's what SANs can provide."*
>
> **–Farid Neema, President, Peripheral Concepts, Inc.**

bus (usually SCSI) to a server on a Unix, Windows NT, or other network. In a SAN, the arrays attach directly to a high-speed loop or star topology – Fibre Channel, FDDI, Serial Storage Architecture (SSA), and Digital Computer Interconnect (CI) – which also attaches to network servers. In a NAS, the network is between the applications and the server. In a SAN, the network is between the server and the storage arrays. In a NAS, the data moves as packets and as files. In a SAN, the data moves as blocks and volumes. In a NAS, data moves at Internet speed (typically 10 Mbps or less). In a SAN it moves at Fibre Channel speed (200 Mbps).

"The major pro of the SAN is performance – data moves at the 200 Mbps of Fibre Channel rather than at the Internet-type speed of the LAN," says Farid Neema, president of Peripheral Concepts Inc., Santa Barbara, Calif. "Another SAN advantage is connectivity, in the sense that you can have as many nodes with Fibre Channel as you want. The con for SAN is that you need to have enough switches, which is costly for an entry configuration.

"The big advantage of NAS is that it is very simple to install at relatively low cost. The other plus is that NAS sends data as files while SAN sends data as blocks or volumes – which are more efficient, but are also harder to manage than files. There are several implementations of people looking into how they can operate in the SAN environment with a specific file management system – the file system in this case would be kind of proprietary."

"What's going to get SAN to work," says Dennis Casey, an analyst with Strategic Research Corp., Santa Barbara, Calif., "is when vendors offer products that you can just buy and install – so that it all works together but it is also proprietary. Right now the pieces are available across various vendors. But in most cases it's something that a professional services division of a systems house is going to have to handle for you." Not only might NAS be preferable to SAN, he says, but NAS might also be preferable to what end-user companies have now. "Instead of hiring a systems integrator and having them put this drive in, you can just buy this box, plug it into a hub and all of a sudden have this other resource there with all this additional storage."

Michael Casey, research director of open systems storage at Gartner Group, Stamford, Conn., also sees proprietary barriers as a key obstacle to SAN acceptance. "If all we're doing is plugging things together with Fibre Channel, than all we have is a faster version of SCSI with more things on it." In particular what he'd like to see is unified management. "What we don't have is one thing that lets you manage everything from one session, to drill down from your general network management into storage management and from there into hardware configuration management, and have it all be consistent."

But help may be on the way. Several vendors, including EMC Corp., Hopkinton, Mass.; Exabyte Corp., Boulder, Colo.; IBM, Armonk, N.Y.; and StorageTek, Louisville, Colo., have all announced centralized SAN management software due out later this year or early next. Both the StorageTek and IBM products will be aimed at unifying management of storage running on multiple operating systems from a single point of contact. For companies used to the tension between storage and distributing processing architectures, the cost of relief may finally come down.

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## Briefs

**GTE** *last week said it has put* **1.6 million local telephone lines up for sale.** *The divestment, which represents around 7% of GTE's 21.6 million-line local phone business, is part of the company's effort to raise between $2 billion and $3 billion to invest in infrastructure improvements. GTE in July agreed to merge with Bell Atlantic in a deal valued at $52.8 billion.*

**PSINet** *last week announced it had* **licensed Inktomi's Traffic Server** *caching software to enhance the ISP's Web hosting services.*

*Traffic Server is planned for deployment within PSINet's Global Internet Hosting Centers and should help speed customer Internet access and enhance Web-site performance. Inktomi has inked similar deals with other companies, including America Online, and is included in products from Intel, Microsoft, RealNetworks, Sun and Yahoo.*

**UUNET,** *an MCI WorldCom company, last week announced Access Optimization Service (AOS), an* **Internet traffic management tool** *that helps customers monitor, manage and prioritize Internet access bandwidth. AOS combines Xedia Corp.'s Access Point router equipment with training services from UUNET and is sold only in conjunction with UUNET T-3 Tiered and Burstable Internet access services. Network administrators, using a Web management package, can monitor, adjust and control the levels of bandwidth allocated to these preassigned classes.*

*AOS is available for $19,500, which includes the Xedia router and training services for the first year. Tiered or Burstable T-3 Internet connections are charged separately and start at $6,000 for monthly service and $6,000 for start-up costs.*

## Vaultline service speeds Internet access

**By Tim Greene**
*Santa Clara, Calif.*

Upstart service provider Vaultline wants to make the Internet faster by helping customers avoid bottlenecks.

Vaultline last week announced four services that will use its network of leased fiber to speed customers' traffic between smaller networks and the Internet or intranets.

Potential choke-points include Internet network access points (NAP), where traffic gathered by ISPs gets dropped onto the public Internet and where traffic from the Internet gets delivered to ISPs.

Rather than use the public Internet to get traffic between NAPs, Vaultline connects NAPs over the company's fiber.

By making those connections, the traffic avoids the congestion that can occur in the NAP. The traffic also has secure dedicated bandwidth for the trip between NAPs rather than contending for bandwidth with other data is running on the public NAP-to-NAP link.

Vaultline gets its customers' traffic onto other carriers' networks through direct private links rather than through formal peering points. Peering points are where the private networks of ISPs are linked.

So, for example, if Vaultline wants to offer access to the UUNET network, it buys access directly to UUNET's network. The alternative, linking Vaultline to UUNET at a formal peering point, could result in performance, according to Tom Hadden, Vaultline's president.

"By not being in bed with any one other carrier, Vaultline will be able to deliver high-quality services from whatever networks are available," says Jonathan Haller, principal analyst for network services at Current Analysis.

While it has quietly been offering services in California, Vaultline last week announced it is expanding its network to Chicago and New York in the first quarter of 1999. By mid-1999, it will establish links to Washington, D.C., Atlanta, Dallas and Los Angeles.

Vaultline will offer the following services:

- VaultLink VPN, which supports Internet virtual private networks, providing security and switching at the edge of other public networks. Circuit costs vary with distance, but links to a VPN cost about $200 per megabit per site per month.
- VaultLink Point-to-Point, which provides direct private lines between sites. The average price for a T-1 in Silicon Valley is $375 per month.
- VaultLink Access, which provides Internet access using other carrier networks. Access costs about $1,000 per megabit per site per month.
- VaultLink Telehouse, which pieces together services using local and long-distance carriers and ISPs. Prices depend on the complexity of the service.

✆ Vaultline: (408) 374-2000

### PROFILE: VAULTLINE

| | |
|---|---|
| **Headquarters:** | Santa Clara, Calif. |
| **Founded:** | February 1996 |
| **Employees:** | 52 |
| **Funding:** | $10 million from Point West, plus private funding |
| **Products:** | VPN services, including VaultLink VPN, VaultLink Point-to-Point, VaultLink Access, VaultLink Telehouse |
| **Competitors:** | GTE/BBN, Cable & Wireless |
| **Fun fact:** | The company still owns the folding table and chairs that furnished its first makeshift boardroom in a warehouse. The furniture now resides in the lunch room. |

### Get more online:

9263

- Traffic statistics for NAPs and metropolitan-area exchanges.
- A look at Vaultline's competitors.

www.nwfusion.com

## Two AVT units enhance fax server software

*High-volume fax package targeted for ERP, groupware customers.*

**By David Rohde**
*Portland, Ore.*

Users should be able to save money on high-volume fax applications with distributed-server software released by subsidiaries of computer telephony vendor AVT Corp.

AVT unit CommercePath, based here, recently released CommercePath 2.0, the latest version of its Windows NT production fax server. Production faxing involves converting back-office data, such as invoices and purchase orders, into fax format for immediate hard-copy shipment, rather than relying on employees to manually initiate fax communications.

CommercePath officials call the firm's new version CommercePath Virtual Server because the functions involved with production faxing — such as inbound routing, managing notifications and sending faxes — can be distributed across the LAN or WAN on CommercePath servers.

In addition, CommercePath 2.0 works with enterprise resource planning applications, such as SAP and Oracle.

The other AVT subsidiary, RightFax in Tucson, Ariz., introduced RightFax Version 6.0, which is targeted at Microsoft BackOffice functions, also runs on Windows NT.

Version 6.0 introduces Microsoft Exchange extensions, providing a single interface from which administrators can manage e-mail and fax users. As a result, adding, removing or modifying users needs to be performed only once but will apply to both applications.

RightFax 6.0 introduces Server Side Application (SSA) Document Conversion. SSA is a native document conversion technology for Microsoft Word, Excel and PowerPoint 97 and 2000 documents. Using SSA, faxes of documents originally prepared with these applications better retain special fonts, embedded graphics and other special formatting.

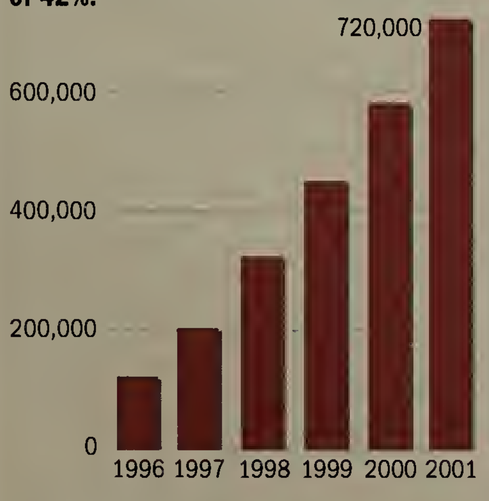
This feature responds to users who want "document fax" rather than "message fax," says RightFax President Brad Feder.

On the client side, the user interface can be integrated with Microsoft Exchange and Outlook.

✆ CommercePath: (800) 600-4329; RightFax: (520) 320-7000

**DOING FAX THE NEW WAY**

**The number of fax-server ports shipped is growing at a compound annual rate of 42%.**



SOURCE: IDC, FRAMINGHAM, MASS.

# Meteor storm threatens satellites

**By Rebecca Sykes**
*Boston*

A meteor storm this week threatens to, but will probably not, short-circuit telecommunications satellites.

On Nov. 17 and Nov. 18, the Earth's orbit will pass through the Leonid meteor shower, so named because it appears to come from the constellation Leo.

Most years, the Earth crosses through a lightly populated part of the 16-million-kilometer-wide shower, which trails Comet Tempel-Tuttle. This year, though, Earth's orbit will plow through a dense section of particles, which sloughed off from the comet in February when it passed close to the Sun.

Meteors are particles the size of a grain of sand, but because they travel so fast — up to 71 kilometers per second — they form a plasma cloud if they hit another object. This could cripple a satellite.

"That is the biggest concern for these missions, that a plasma cloud will be generated and that it will cause some electrical disturbance," says Phil Liebrecht, associate director for networks and mission services at Goddard Space Flight Center, a NASA facility in Greenbelt, Md.

But the risk is small. In 1966, when Leonid last peaked, there were still several miles between the particles of the storm, according to Geoff Chester, public affairs officer at the U.S. Naval Observatory in Washington, D.C.

Within an area of about two miles, the odds of a satellite being hit are the same as "the odds of a pea hitting something the size of the house," Chester says.

Those odds were good enough for PanAmSat, which recently launched a Pacific Ocean Region satellite from Kazakhstan, bringing the number of its spacecraft fleet up to 18.

**Satellites will be flying** *through a meteor shower this week, as this photo illustration demonstrates.*

NASA-ARC/COURTESY ROBERT HAAS

Not all satellites face the same risk, and PanAmSat apparently thought the risk did not warrant waiting. Low-earth orbit (LEO) satellites, which rotate close to the Earth in 90- or 100-minute cycles, will be shielded by the Earth for approximately half the duration of the shower, according to Chester.

Geostationary (GEO) satellites are too far from Earth to be shielded and will be at risk the entire time, as will the handful of heavy-duty scientific satellites, which are farthest away, he says.

Risk models vary, but LEOs and GEOs probably face a risk on the order of a hundredth of a percent, according to Liebrecht.

In fact, LEOs continuously have a higher chance of being hit by one of the 8,000 human-made objects larger than a soccer ball in orbit around them, including spent rocket boosters and trashbags from the Mir spacecraft, according to Chester.

"The probability is greater that a LEO will be incapacitated by a piece of space junk," Chester says.

Still, many commercial and scientific satellites will be rotated so their vulnerabl parts, including antennas an solar panels, are turned awa from Leonid.

At NASA's Goddard Spa Flight Center, 60% of the 2 satellites will be reoriented s that the solar panels, whic power the satellite's batterie are on edge, minimizing th surface that is exposed to th storm, Liebrecht says.

Loral Space & Commun cations, which has a fleet of 1 broadcast and communic tions satellites, will also tur the solar panels on many of i satellites, according to a Lor spokesman.

Loral has also reviewed i contingency plans for re establishing service for its cu tomers in case anything ha pens, the spokesman say Realigning the satellites wi not interrupt service for com mercial customers.

*Sykes is a correspondent with th IDG News Service in Boston.*

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**WAN MONITOR**

# AT&T and Bell Atlantic spar over New York long distance

Perhaps you've heard about the recent brawl between Al D'Amato and Chuck Schumer for one of the U.S. Senate seats from New York (Schumer scored a knockout).

Now that it's over, it's time to move onto the main event: the heavyweight bout between Bell Atlantic and AT&T over Bell Atlantic's application for long-distance authority in New York.

Bell Atlantic hasn't actually made its filing at the Federal Communications Commission yet, even though the filing was promised long ago and Bell Atlantic has already gone to great trouble to get the state regulator's blessing.

But now Bell Atlantic says the filing is finally coming next month. And in a classic preemptive strike, AT&T recently called a telephone conference to blast Bell Atlantic's performance as a dominant local carrier. In the three months since AT&T took over alternate carrier Teleport Communications Group, AT&T's experience routing new orders through Bell Atlantic has been "horrible," says Michael Morrissey, AT&T's vice president of law and government affairs.

Bell Atlantic is obligated to hand over customers within five days of notification that another carrier has won their business. The regional Bell operating company has failed to meet that standard 95% of the time, Morrissey claims. He cites numerous other failings of Bell Atlantic, including this chilling little statistic: 15% of customers who leave Bell Atlantic get dropped entirely from directory assistance.

"Bell Atlantic has demonstrated that it cannot yet handle the task at hand," Morrissey says.

New Yorkers and others may have already picked up the irony in these charges. For a decade, Teleport was a successful competitive local exchange carrier (CLEC) — so successful that AT&T paid $11 billion for it. Now suddenly it's an enfeebled tyke being overwhelmed by the big, bad monster RBOC.

**David Rohde**

Several reporters participating in the telephone conference picked up on this change of tone. I asked Morrissey directly whether airing these problems could have the effect of making users reluctant to switch from Bell Atlantic.

"It's a real danger," Morrissey conceded, adding there's a "dynamic tension" between AT&T's policy obligations and its desire to get a payback on its investment. Morrissey added that AT&T's problems are concentrated on orders where AT&T must obtain at least the local loop from Bell Atlantic, rather than Teleport's original business of building fiber links directly into a customer premise.

For their part, Bell Atlantic officials are certain AT&T will do or say anything to keep them out of long distance. "This is another in a long line of delaying tactics," Bell Atlantic spokesman Mark Marchand says, adding the ultimate telecom industry insult: "They're just gaming the regulatory process." Bell Atlantic's own records show that it meets the five-day standard for order turnover 85% of the time, and it currently processes up to 2,000 change orders per day from more than 50 CLECs in New York.

The FCC will have to sort through a lot of special-interest agendas to get to the truth here. Fortunately, the state regulators have hired KPMG Peat Marwick to run an independent test of Bell Atlantic's competitive-carrier ordering systems.

When decision time comes, the FCC had better demand hard documentation because with both sides spouting opposite statistics, someone isn't telling the truth.

*Rohde is a senior editor with* Network World. *He can be reached at drohde@nww.com.*

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## Briefs

■ **NetMechanic,** *a Web site maintenance service, is offering four free tools to help you* **clean up your Web site.** *You go to the home page, select a tool, enter a URL and the results are e-mailed to you as a report. Link Check tests all links within a Web site. HTML Check checks all tags for syntax errors and browser compatibility problems. Server Check monitors Web servers and sends e-mail if it detects a problem. GIFBot reduces the file size of Web graphics for faster loading.*

*Server Check Pro hits a Web page every 15 minutes, 24-7. The subscription charge is $10 per month for each monitored URL. For more information, contact NetMechanic at www.netmechanic.com.*

■ *Security vendor* **Cylink** *last week said the company overstated its 1998 first- and second-quarter earnings by approximately $5 million and $6.7 million, respectively. This results in restated* **revenue of approximately $10.8 million** *for the first quarter and $11.3 million for the second quarter.*

*The scandal forced President and CEO Fernand Sarrat to resign. Cylink's vice president of product management and strategy, William Crowell, was named president and acting CEO of the Sunnyvale, Calif., firm.*

*Cylink's Crowell*

■ **Worldtalk** *this month will release a* **beta version of World/Secure Web,** *a plug-in for the Microsoft Proxy Server that lets administrators configure the proxy server to filter content, detect malicious code, detect viruses and block Web sites. World/Secure Web, planned to ship early next year, will cost $3,995 for 50 users.*

*©Worldtalk: (800) 454-4674*

*In-Site*

# Cache beats back bandwidth blues

**By Robin Schreier Hohman**

Some network administrators spend a lot of time monitoring Internet usage, setting firm rules and issuing threats when users grab more than their fair share of the pipes.

Steve Hosack, manager of worldwide networks at network vendor Adaptec, says that's a waste of time.

The majority of his employees use the Internet for work, and he says he'd only be asking for trouble if he tried to change people's habits.

Besides, he couldn't throttle the Internet access — the company has a lot riding on it, especially considering the company extranet is becoming a wagon train for suppliers and customers.

To keep things moving smoothly, Hosack scrapped Netscape's proxy server in favor of a dedicated network appliance for caching.

Hosack started his caching search this past December, when he began beta-testing network appliances from CacheFlow, a 2-year-old start-up in Sunnyvale, Calif. Network appliances, such as CacheFlow 100 are self-contained units that do only one thing — cache Web traffic. CacheFlow 100, the company's smallest box, can store 2G bytes of data, comes with 128M bytes of memory and hooks up to a router or a switch at the edge of the network.

Hosack put CacheFlow boxes into production in March. Since then, "we never hit any level of traffic where performance went down — no matter what kind of load we put on it," he says. In addition to CacheFlow 100, he's using two CacheFlow 1000s, which are high-end, carrier-class boxes with 25G bytes of storage, 256M to 512M bytes of memory, with two to four 10/100M bit/sec Ethernet ports.

### Another source of cache

While CacheFlow is pitching the fact that it does nothing but caching, Network Appliance is relying on the strength of its experience in building dedicated file servers.

That experience was one reason Glenn Newell, intranet architect at National Semiconductor, went with the older company. National Semiconductor has over a dozen NetApp file servers.

Like Adaptec, National Semiconductor used Netscape's proxy server before going dedicated. National Semiconductor tried several caching implementations in the firewall — he won't reveal details because of security — but "network performance actually went down when we tried to do any caching," he says.

Newell has had a better experience with the two Network Appliances' NetCache C230 boxes that now sit between each of his T-1 lines and a 10M bit/sec switch. Out of the box, he saw a 20% drop in bandwidth usage. And after fine-tuning it a bit (he says instructions for dealing with cookies were unclear), his savings shot up to 40%. Newell saw a dramatic decrease in the time it takes to view 40% to 60% of Web pages. NetCache C230 has up to 256M bytes of memory, up to 36G bytes of storage, Ethernet, FDDI or ATM connections, and starts at $16,555.

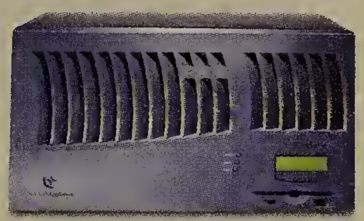
Network Appliance recently announced its second-generation of caching boxes, the NetApp C700 series, with Version 3.3 of the NetCache software. Network Appliances says the new line has twice the performance of the old line. NetApp 720s has 512M bytes of RAM, up to four 9G-byte disks and all flavors of Ethernet, FDDI and Copper Distributed Data Interface connections (no ATM). Pricing starts at $19,995. ■

## The caching bonus

**Caching appliances, a new kind of network hardware, store Web pages and then match HTTP requests from the local storage system, rather than returning to the Internet. Caching appliances, such as those shown here, consist of:**

- A dedicated caching operating system.
- A rack-mounted footprint.
- One or more CPUs.
- An optimized storage system with one or more hard drives.
- At least 128M of RAM, usually more.

*The CacheFlow 500*



*Network Appliances' NetApp C760*

### Get more online:

- An update on caching technology.
- A look at a proposal for an Internetwide caching system.

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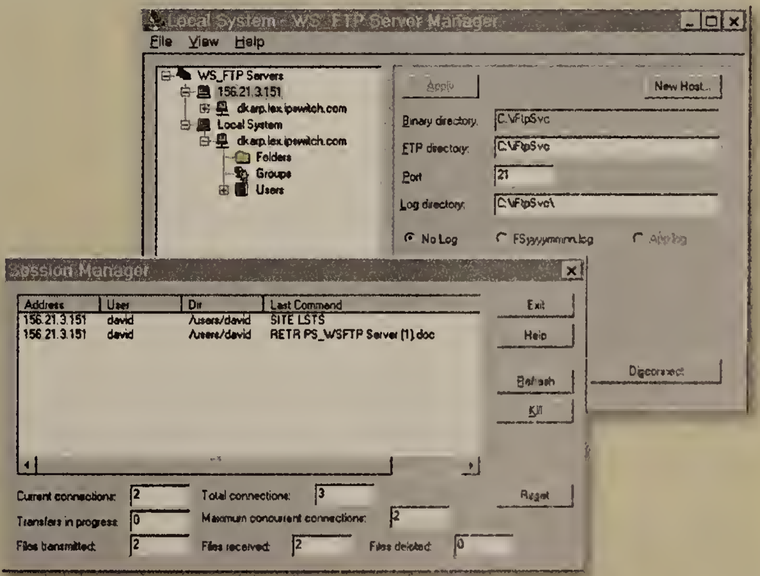
www.nwfusion.com

**QUICK TAKE: FTP SERVER FOR WINDOWS NT 1.0**

## Ipswitch simplifies FTP server management

Ipswitch, maker of the popular WS_FTP Pro File Transfer Protocol (FTP) and low-priced What's Up Gold network management software, has released a new program that takes the strain out of running an FTP server. WS_FTP Server for Windows NT Version 1.0 can resume a dropped session and encrypt passwords for users of its WS_FTP Pro FTP client. Ipswitch says the software is scalable and secure, provides virtual host support and takes permissions from existing NT user accounts. WS_FTP Server is priced at $295 until April 30, 1999; the price will then increase to $395.

**Ipswitch: (781) 676-5700**



Binary directory: C:\FtpSvc

FTP directory: C:\FtpSvc

Port: 21

Log directory: C:\FtpSvc\

● No Log ○ FSyyyymmm.log ○ A/p.log

| Address | User | Dir | Last Command |
|---|---|---|---|
| 156.21.3.151 | david | /users/david | SITE LSTS |
| 156.21.3.151 | david | /users/david | RETR PS_WSFTP Server (1).doc |

Current connections: 2

Total connections: 3

Transfers in progress: 0

Maximum concurrent connections: 2

Files transmitted: 2

Files received: 2

Files deleted: 0

# Secret handshakes and other little-known Lotusphere facts

By Paul McNamara

*"Going to Lotusphere 1999? Visit the Unofficial Gonzo Page 1999. It has all the stuff Lotus forgets to tell you about: hotels, tips, tricks, secret handshakes and where to get food and drink."*

*— From Notes user Scott Wenzel's e-mail signature*

OK, there is no secret handshake.

However, the 10,000 Lotus customers planning to attend Lotusphere in January in Orlando, Fla., will find plenty of other useful tidbits at Scott Wenzel's amusingly unofficial conference Web site.

As for the untold thousands who want tickets but have been shut out of this sold-out show, they may find an answer to their problem on Wenzel's site. There's a section designed to match ticket seekers with anyone who might have an extra, although it's worth noting the former outnumber the latter by some 30-to-1.

While not everyone has been amused — Wenzel did hear from Lotus' lawyers, albeit politely — those interested in taking a look should point their browsers to www.fred.net/turtle/lotusphere.html.

Wenzel's paying job is being the Lotus Domino guru at the Social Security Administration office in Baltimore. So what might possess a guy to devote so much time and energy to a Web site about a trade conference?

"There was kind of an information vacuum that needed to be filled," Wenzel explains. "So I said, 'OK, I'll take it on.' "

**LOTUSPHERE LOW-DOWN**

**A customer's unofficial site**

www.fred.net/turtle/lotusphere.html

**Lotus' official site**

www.lotus.com/98/lotusphere/nsf

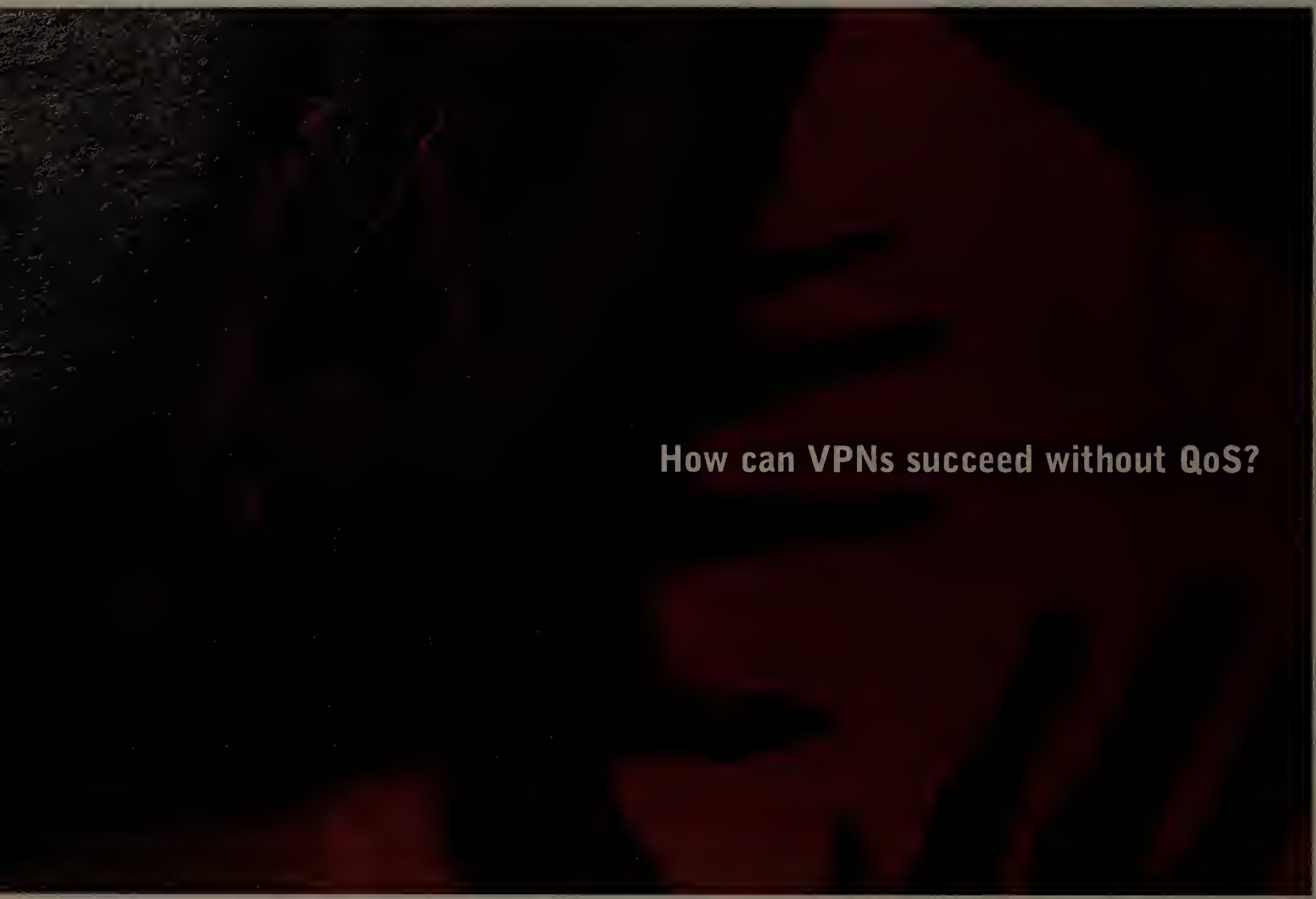
His site, launched in August, includes "a veteran's" advice on the predictable stuff, such as airfares, hotel bargains and rental cars, as well as less obvious topics, such as how to ensure your conference registration doesn't get messed up. You'll also find tips on where to eat, drink and be merry in the Orlando area.

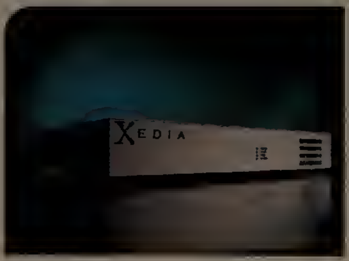
"Ideally, I'd love to see Lotus provide this information," Wenzel says. "But they've got kind of a sketchy Web site up that basically tells you everything you already know: 'We're sold out, all the hotels are sold out, we'll see you in three months.' "

Word of Wenzel's site has spread primarily through newsgroups such as comp.groupware.lotus-notes and mailing lists. The site has received visitors from 33 countries and, at peak traffic, was fielding up to 1,000 hits per week, he says.

While the early inquiry from Lotus may have suggested it was less than pleased with the site, company officials now say they're happy to have Wenzel spreading the Lotusphere word.

The feedback from visitors has been overwhelmingly positive, Wenzel adds. He even received a vote of confidence about the site in an e-mail from a Lotus employee: "Lots of great info. I went to Lotusphere for the first time last year, working for Lotus. This would have helped a lot." ■


How can VPNs succeed without QoS?



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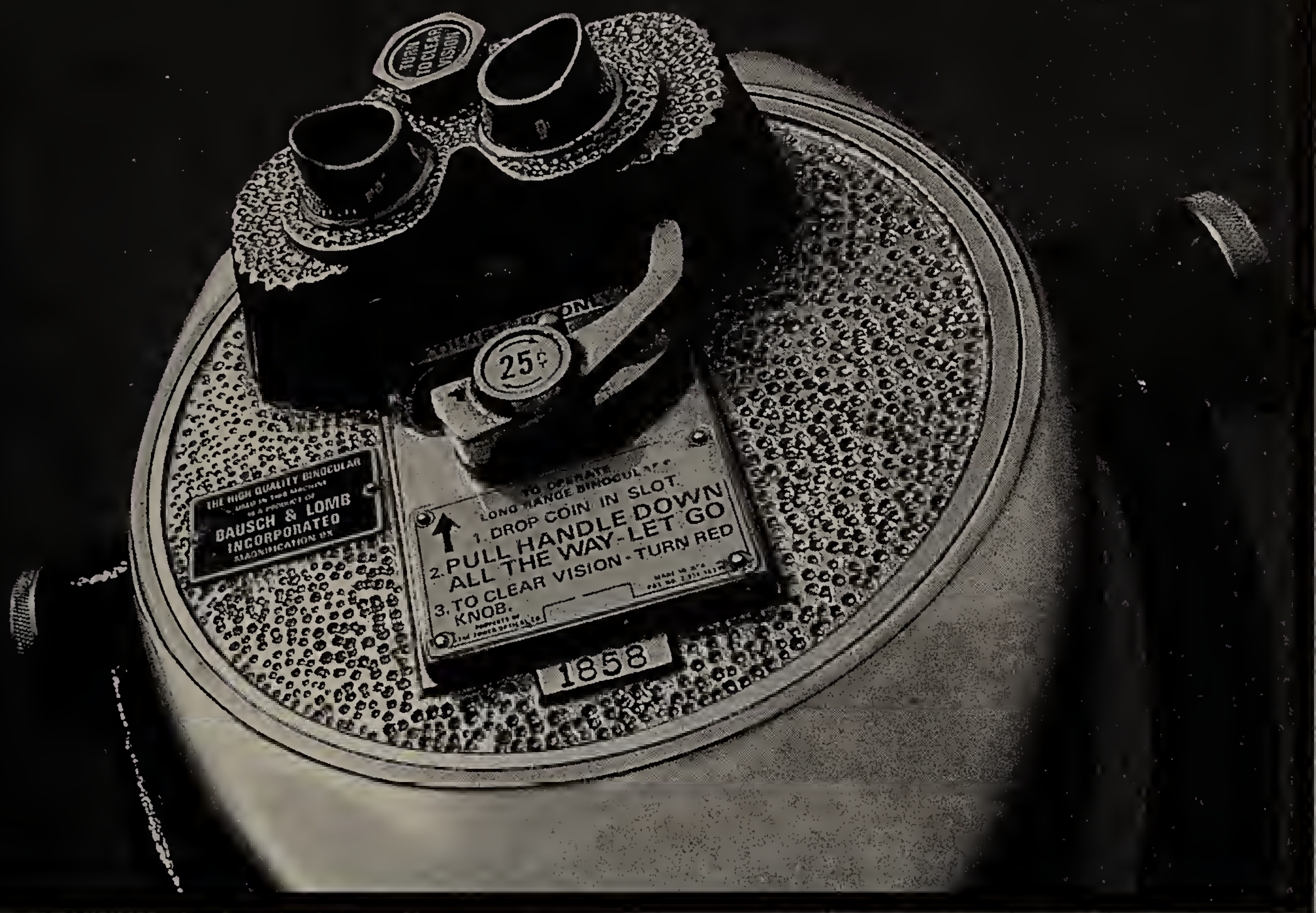
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'NET INSIDER

# Complexity as a weapon

For years I've lamented the growing perceived and actual complexity of things.

The engine compartment and the dashboard of my 1998 Dodge Caravan are a far cry from the ones in my 1917 American LaFrance and in the late-1970s van I once owned. In spite of this, operating the Caravan is actually easier than operating the LaFrance or the Ford.

The operation is simple in spite of the underlying complexity. That does not mean the underlying complexity is not a worry. I used to be able to repair the engine on the Ford, but did not even bother to get the owner's manuals for the Caravan.

Sometimes there seems to be no reason for the complexity. One of the most common and frustrating examples of this is setting the time on a VCR. It seems vendors go to great lengths to ensure that VCRs will blink 12:00 whenever they are powered up.

In the past, I've assigned blame for such complexity to interface design engineers who have no human factors training. But there may be more to the complexity than that.

Two weeks ago someone at Microsoft leaked an internal document discussing strategies that the company could use to counteract the push by some organizations and companies toward an open source software (OSS) model of software development. An annotated version of the memo has now been posted on the World Wide Web under the somewhat pejorative name "The Halloween Document" (www.opensource.org/halloween1.html). Most of the document discusses assertions that Microsoft could make to blunt the appeal of the open source process used by many Internet developers, including Netscape. But a small section of the document refers to the danger that simple systems represent.

**Scott Bradner**

The memo says, "OSS projects have been able to gain a foothold in many server applications because of the wide utility of highly commoditized, simple protocols. By extending these protocols and developing new protocols, we can deny OSS projects entry into the market."

This is scary, not because it is a Microsoft person saying this, but because it could explain all too much of what we are now seeing in the standards development world. Many of the standards proposals are far more complex than problems would seem to require.

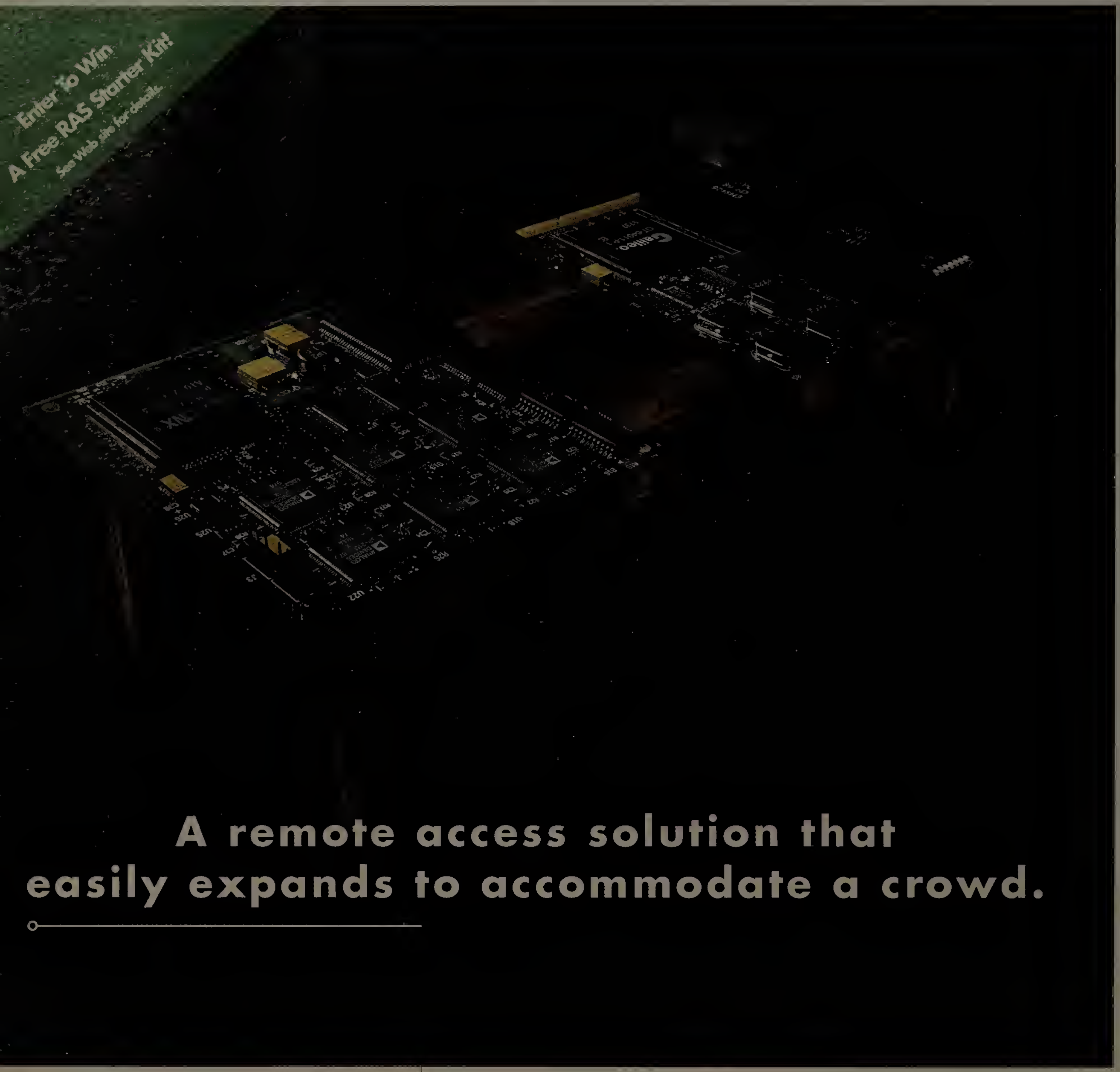
Once upon a time, simplicity was a design goal for IETF protocols, best expressed in RFC 1958, "Architectural Principles of the Internet." It says, "Keep it simple. When in doubt during design, choose the simplest solution."

We now seem to have purposeful complexity, designed to make it difficult for small organizations and individuals to implement protocols. This is not good.

David Isenberg, the author of *The Stupid Network,* the other day asked me, "How many IETF working groups are trying to make the 'Net simpler?" The only working group I could point to was the one for Differentiated Services. It's time to get simplicity back as a design goal.

Disclaimer: Harvard's organization is anything but simple, so the above must be my own thoughts.

*Bradner is a consultant with Harvard University's University Information Systems. He can be reached at sob@harvard.edu.*



A remote access solution that easily expands to accommodate a crowd.

The DataFire RAS 48, with up to 48 modem channels. It supports K56flex (software-upgradeable to V.90), as well as ISDN via T1 or PRI connections.

The DataFire RAS 4, with 4 BRI ISDN connections and 8 integrated modems. It also supports K56flex (software-upgradeable to V.90).

The AccelePort RAS 8, with up to 8 POTS connections and integrated modems, supports K56flex (software-upgradeable to V.90).

The DataFire *GO!* PRO, a client PC card that supports Ethernet, K56flex/V.90, PCS and ISDN connections.

Expecting more remote users? Just slide a Digi RAS concentrator into a PC-class server. The powerful new RAS concentrators from Digi range from 4 to 48 analog or ISDN channels. With a four-slot server, you can accommodate as many as 192 channels.

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# Technology Update

**Covering:** Evolving Technologies and Standards

## NUTTER'S NETWORK HELP DESK

*Ron Nutter, a Master Certified Novell Engineer and Microsoft Certified Systems Engineer in the Lexington, Ky., area, tracks down the answers to your questions. Call (800) 622-1108, Ext. 7476, or send your questions to helpdesk@networkref.com.*

**How do I install NetWare IP on a system in which the only server available is an SFT III pair? The SFT III pair must support Novell's Domain Name System, Domain Sap Server, Dynamic Host Configuration Protocol (DHCP) and NetWare/IP, as well as a Class C addressing structure.**

**Via the Internet**

Installing NetWare/IP on an SFT III system is doable but will require some planning and a few extra steps during implementation. The first thing you'll need is separate IP addresses for the network cards in the SFT III server pair because TCP/IP addresses network cards at a physical layer.

For information about installing NetWare/IP on an SFT III server, run a keyword search of "SFT" on the NetWare/IP product page at http://support.novell.com. Look for Technical Infor-mation Document (TID) No. 2931884, which says you can install NetWare/IP on an SFT III server once you've obtained the NIP203.EXE update to NetWare/IP.

The document outlines the necessary installation steps, to which I suggest an addition to take advantage of SFT III and provide more fault tolerance to the NetWare/IP installation. Take the second IP address on the network card in the companion SFT III server and set it up in Unicon utility to be a secondary Domain Sap Server. Also check out TID No. 2910053, which will give you information about implementing DHCP on this configuration also.

A number of other documents on Novell's support site might come in handy, too. It'd be worth your while to review the TIDs and print out those that might be helpful. You'll have them when you start the implementation of NetWare/ IP on SFT III.

# Freeing the LAN from backup traffic

**By Robin Purohit**

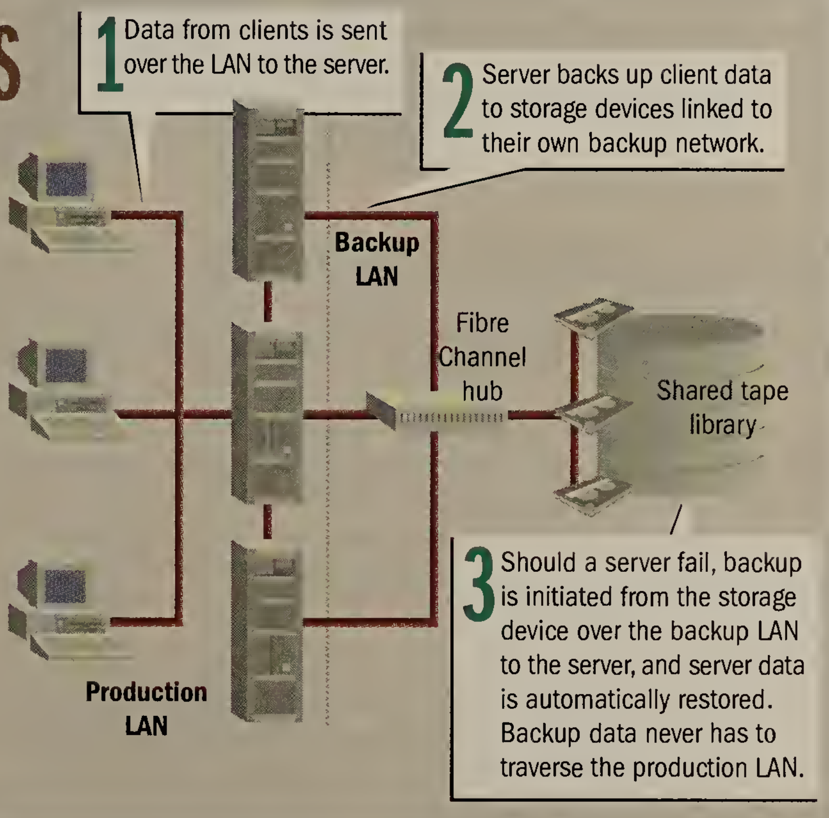
Network backup is one of network management's greatest headaches. Frequently difficult to manage and tedious to implement, backup can choke the LAN, slowing down critical user applications.

Now a technique known as LAN-free backup — one of the first of a new breed of storage-area network (SAN) applications — promises to bring an end to LAN backup hassles through a combination of technological and topological advances.

## HOW IT WORKS

### LAN-free backup

Moving data in and out of storage devices and over the LAN can cause network delays. Consequently, most IT organizations prohibit backups from running across the backbone during working hours. LAN-free backup aims to eliminate that problem by sending server data to a centralized network of storage devices that can back up server data without putting the data on the production LAN.



1 Data from clients is sent over the LAN to the server.

2 Server backs up client data to storage devices linked to their own backup network.

3 Should a server fail, backup is initiated from the storage device over the backup LAN to the server, and server data is automatically restored. Backup data never has to traverse the production LAN.

### The need for better backup

Thanks to today's increasingly powerful network and server technologies, enterprise users are accessing data more easily. And thanks to the convergence of data, voice and video, users are also exposed to ever-greater quantities of information.

But having more data can be a double-edged sword, particularly when backing up that data involves travel across the production LAN, as it does in nearly all of today's business organizations.

For users, performing backup over the LAN can be excruciatingly disruptive — and slow. A daily backup can suddenly introduce gigabytes of data into the normal LAN traffic.

In a shared Fast Ethernet LAN, backup can cause momentary slowdowns; in a shared 10M bit/sec LAN, it can bring response times to a crawl, lowering productivity and raising frustration. To the network manager, it can mean an extra dose of effort, and perhaps even risk, to prevent backups from disrupting production work by scheduling them around the normal workday routines.

The solution to LAN backup problems may be found in the form of new topologies based on dedicated SAN architectures.

The new SANs — for which LAN-free backup represents a potential "killer app" — represent a departure from conventional LAN backup schemes, which employ storage devices that are directly attached via SCSI to the LAN's servers. In such systems, backup traffic must flood the LAN to get to the designated backup server or servers.

Now, rather than using SCSI, newer SANs employ Fibre Channel. They also use star-wired hubs in combination with storage management software that can mediate contention and synchronize data — activities necessary for moving backup data from multiple servers to multiple storage devices.

In a LAN-free backup architecture, a Fibre Channel adapter is installed in each server. These are connected via the server's PCI bus to the server's operating system and applications. And because Fibre Channel's transport-level protocol wraps easily around SCSI frames, the adapter appears to be an SCSI device.

The adapters are connected to a single Fibre Channel hub, running over fiber-optic cable or copper coaxial cable. Category 5 cable, the high-end twisted pair rated for Fast Ethernet and 155M bit/sec ATM, will be a future option.

Attached to the hub via Fibre Channel is some type of automated tape library. This machine typically includes a mechanism capable of feeding data to multiple tape drives and may be bundled with a front-end Fibre Channel controller. Existing SCSI-based tape drives can be used also through the addition of a Fibre Channel-to-SCSI bridge.

Storage management software running in the servers performs contention management by communicating with other servers via a control protocol to synchronize access to the tape library. The control protocol maintains a master index and uses data maps and time stamps to establish the server-to-hub connections. Currently, control protocols are specific to the software vendors. Eventually, the storage industry will likely standardize on one of the several protocols now in proposal status before the Storage Network Industry Association.

From the hub, a standard Fibre Channel protocol, Fibre Channel-Arbitrated Loop (FC-AL), functions similarly to token ring to ensure collision-free data transfers to the storage devices. The hub also contains an embedded SNMP agent for reporting to network management software.

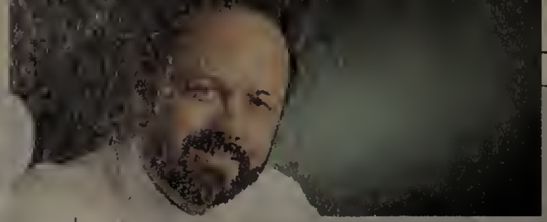
With this architecture, the hub is able to multiplex connections between servers and storage devices at the 100M byte/sec transfer rates of Fibre Channel.

While the architecture is simple to describe, it is best implemented by vendors with understandings of — and partners in — the various component hardware and software technologies, from the Fibre Channel adapters and managed hubs to the server software.

It's a good idea to begin with simple installations, as described above. Over time, standards and technologies will mature, and a move to more complex configurations, such as switch-based architectures, will be more feasible.

Also over time, users can expect to find their SAN applications expanding beyond LAN-free backup. On the horizon will be other applications, from remote mirroring to clustering and disaster recovery, that are also best performed away from the production LAN.

*Purohit is a senior product manager for SAN strategy at 3Com. He can be reached at Robin_Purohit@3Com.com.*



## EDITORIAL *insights*

# A plea for logic in e-mail addressing

In the grand scheme of things, this isn't one of the big problems. But it is annoying, and it would be pretty easy to fix. I'm referring to the lack of any logic or consistency in the way most companies set up their e-mail addressing. How about a little simplicity here, folks? How about making it easy to send someone a message?

I'm tired of trying to send a note only to have it bounce back again and again as undeliverable while I try to figure out what quirky method this particular company has instituted for assigning e-mail addresses. Do I use the first initial of the first name followed by the last name, or some portion thereof? Is it firstname_lastname? Firstname.lastname? Lastname first, followed by first name or first initial? Who knows? And just how do you find the correct address without calling the company and having to go through suspicious assistants and PR people?

You could check the company's Web site or a business card from another employee, but even when you can find an e-mail address that indicates a particular addressing convention, it may not be applied across the board. I know this painfully well from handling the logistics for our Showdown debates. The CEOs of many companies use their own quirky addresses, meaning it is virtually impossible to reach them without getting in touch with their handlers.

Worse, some companies guard their e-mail addresses like little treasures, refusing to give them out without some kind of special dispensation. What gives? I don't want to come to your house; I just want to send you a note. Why do you make it so hard to find out these things? Do you want me to waste the time of, say, your CEO's assistant and several people in PR? Do you want me to tie up your fax machine and phones? Do you refuse to give out mailing addresses because you're afraid you may actually get something in the mailbox?

E-mail is supposed to make life easier and streamline communications. It's the single most important communications tool we have these days. I'm begging you to standardize on a simple addressing scheme and make everyone stick to it. Publicize it on your Web site. Make your e-mail system forgiving — enable it to accept different variants on a name. Get rid of cutesy exceptions. Make sure everyone has an e-mail address on his or her business card.

Won't you join me in this crusade for logic in e-mail addressing? Drop me a note to enlist!

*John Gallant, editor in chief* jgallant@nww.com

*Smart networks • Glenn Ricart*

# Intelligence is moving to the middle of the net

Computing intelligence is moving from the ends of the network to the middle. Today we have smart endpoints (client and server) and a dumb network in the middle. But in the near future, the network will become smart and it will connect clients of varying intelligence, including consumer devices, lightweight network computers and Windows terminals that might be characterized as relatively dumb.

Two factors are driving the migration of computing intelligence to the middle of the network. First, network delays are increasing as networks become larger and contain more routers and other relay points between clients and servers. Moving intelligence from traditional servers into the network, closer to the client, can reduce these delays dramatically.

Second, Moore's Law has reduced the cost of moving intelligence into the middle of the network. Processor chips and memory have become inexpensive compared with what major carriers charge to take client traffic to and from distant servers. Pairing or merging a server and router is usually cost-effective compared with forwarding all traffic to a central location.

We've already seen the beginning of the intelligence-in-the-middle trend. Caching servers such as Novell's FastCache sit in the network near the client to reduce network latency and external network traffic. Corporate PointCast servers do the same thing.

It's easy to see that most network services, including directory, multimedia, collaboration and management services, are best sprinkled throughout the network so clients can take advantage of whichever middle server is closest. For example, Sun's Jini is a self-configuring set of network services built on an intelligence-in-the-middle model.

Other kinds of network servers also can benefit from being placed in the network. Servers for buddy lists, such as the AOL Instant Messenger, could take advantage of most buddies being relatively local in the network sense.

That leaves the hard-core vertical applications — the ones that depend upon databases and heavy-duty application codes. The client/server revolution freed many of these applications from traditional mainframes but, in essence, only split out the graphical user interface from the rest of the application code, leaving the rest to run in a new generation of mainframe-like heavy-duty servers.

In the next generation, these monolithic applications will be broken up into functional components using object technologies. Because most of a normal application's code is actually dedicated to error handling, obscure menu items and other rarely used features, the small collection of objects actually needed will be much more modest and amenable to being executed within the network.

The job of determining where everything should be located in the network is reduced to a problem of optimization. For best response time, put everything as close to the clients as possible. To minimize communications costs, look at the relative volumes of traffic needed for client interaction, moving and caching application code objects, as well as moving (and possibly caching) portions of the database being accessed.

The object-oriented language of choice for intelligence in the middle is Java because of its widespread implementation on platforms hosting caches and sometimes routers, as well as on clients and servers.

By executing Java in the network and close to the client, there are clear benefits — lower latency and less network traffic. The economic advantages become more compelling each day that CPU, memory and disk drive prices fall. As a result, intelligence in the middle will be one of the most important network trends of the next decade.

*Ricart is Novell's chief technology officer. He can be reached at Glenn.Ricart@novell.com.*

## MESSAGE QUEUE

*Send letters to nwnews@nww.com or John Gallant, editor in chief, Network World, 161 Worcester Road, Framingham, MA 01701. Please include phone number and address for verification*

### Telcos tackle Y2K

Your article "Telcos go down to Y2K wire" (Oct. 19, page 1) did not present a balanced picture of how far many carriers have come in preparing for Year 2000.

In 1996, the Telco Year 2000 Forum (www.telcoyear2000.org) was formed to aid in the quick resolution of Year 2000 issues. Members include Ameritech, Bell Atlantic, BellSouth, Cincinnati Bell, GTE, SBC Communications and US WEST. The forum undertook a voluntary, self-funded project to conduct interoperability testing of the components of the

Yankee Ingenuity • Howard Anderson

# A little knowledge is a dangerous thing

Now that we're all sick of Year 2000, what will be the next big thing to spew forth from the Great American Hype Machine? Here's a hint: What happens when you combine Web-enabled applications with networks? You get knowledge management — and now you have to build the network to support it, whatever "it" is.

Say you run an engineering design firm, and you're building a rubber vulcanizing plant in Vail, Colo. Where else have you built such a plant? Who was the designer? Are there parts of the last plant's design you can plop into the new plant? Is this the best rubber vulcanizing plant you have built (that is, best of breed)? In other words, can you reuse your intellectual assets and code and get paid for doing so?

If you think this sounds a little like the rationale behind object-oriented computing, you're right. And if you have decided that knowledge management is going to require a lot of bandwidth and storage, go to the head of the class. I know network managers who are salivating over knowledge management because they now have a reason to build the biggest damn pipes in the world — and the network management system to go with them.

Suppose you have an engineer in Vail designing a pumping subsystem for the plant, and he needs to move massive visual files to his counterpart in London. How do you spell F-R-A-M-E? You need to have a Web site so your engineer can send a query out to those who have built similar plants ("Anyone have experience with a Type 5 sludge pump?") Part of your team has part of the solution, another part of the team has the other part — you think. It would be nice to have a chat room to bring them together.

Further, some of the knowledge is implicit, some is explicit, some intuitive or tacit. Who does the mapping to figure that out? The explicit knowledge is part of your procedures — you have, in effect, codified the tacit knowledge and come up with routines that have to be followed. But what about knowledge that is outside your company but available to you? Does that pump manufacturer maintain a Web site on which the stress data on its pumps is updated?

Getting complicated? Of course — it's supposed to be. But don't allow yourself the luxury of letting your skepticism degenerate into cynicism; there is a pony in all this mess.

IT's job is to figure out where the low-hanging fruit grows — where can knowledge management be deployed with immediate returns, low risk and quick implementation? It's your job to build the flexible network that can support early tests and make knowledge management a corporate resource.

Now every company I know has played with the idea of object-oriented computing for five years, but most have done squat about it. Lots of talk, no action. What we need to do is use the spirit of cooperation we rallied to tackle Year 2000 to build some knowledge management buy-in.

Finally, how will we know when knowledge management has gone from a laboratory curiosity to hot overhype? Here are the top 10 clues:

10. Knowledge management is the subject of a *BusinessWeek* cover story.

9. IBM spends $200 million to advertise its desire to be your "knowledge management partner."

8. Harvard Business School writes a dozen knowledge management cases, and Stanford initiates a Master's in Knowledge Management program.

7. The Yankee Group begins a Rolling Thunder Six-City Seminar Series on "Demystifying knowledge management."

6. *Information Week* runs an article, "The knowledge management backlash: What you need to survive."

5. Volpe Brown Whelan runs the first knowledge management investor council; Bear Stearns buys one of each of the 450 knowledge management tools on the market; Merrill Lynch starts a "Knowledge Management Top 100 Index."

4. Kleiner Perkins starts a special knowledge management venture fund and won't let you in; Battery Ventures bootstraps three companies — two of them in exactly the same space.

3. Paul Allen buys all of the knowledge management start-ups passed over by the venture capitalists and makes 10 times the money the professionals do.

2. The Knowledge Management Association is formed, with offices in Washington, D.C. Microsoft wants to join, but what is an association if Microsoft can't be denied admission?

1. Xerox repositions itself from the "Digital Document Company" to the "Knowledge Management Company;" stock goes up 10 points.

*Anderson is founder and president of The Yankee Group, a Boston-based consultancy. He tries to keep his skepticism from degenerating into rampant cynicism, a battle he appears to be losing. He can be reached at handerson@yankeegroup.com.*

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local networks.

By the end of this year, the forum expects to have completed all of its test cases (more than 2,000 in all) involving equipment and software, including essential network functions such as E-911, data transport and intelligent networks. Out of more than 1,000 tests performed to date, only a handful of issues were referred to suppliers for resolution. The fact of the matter is that the network does not add any date information to a customer's voice or data transmission, and there are no network interoperability standards changing as a result of Year 2000.

The Telco Year 2000 Forum's individual participants will continue their efforts in three areas:

- Customer outreach. All forum members have organized discussion groups and one-on-one meetings with mid-size and large business customers. While it is generally not feasible for forum members to conduct individual tests with customers at this time, members have been sharing information about their testing plans.
- Testing. The Telco Year 2000 Forum and its individual members are working with the Alliance for Telecommunications Solutions, which includes other major telcos such as AT&T and Sprint, to identify areas such as congestion and network stress affected by Year 2000.
- IT systems. All forum members have inventoried and assessed their networks and IT systems, and have been performing upgrades and replacements as needed. Forum members will have completed most of their IT system upgrades by the end of this year, and all mission-critical network upgrades are scheduled for completion by the second quarter of 1999.

Upgrading and modernizing telecommunications networks has been a continual part of the telcos' job for more than 100 years. Year 2000 is a challenge that all of us are more than capable of handling.

*Gene Chiappetta*
*Chairman*
*Telco Year 2000 Forum*
*New Haven, Conn.*

## In praise of Linux

In his column, ("A sermon on Linux: Part 2, " Nov. 2, page 74), Mark Gibbs asks: "Given there is a fast, zero-cost, reliable operating system that is in principle (if not in practice) as supportable as Windows NT, why aren't you using it?" I wish this question could be posed to every non-Linux user.

Linux has worked flawlessly for me for better than a year now, and going without it is unthinkable. Linux is, without a doubt, suitable for corporate networking. It doesn't require any skills or aptitude that a decent network administrator doesn't already possess, and it's proven itself to be speedy, reliable and flexible. What more could one ask for?

*Christopher Carlson*
*IS administrator*
*CertainTeed*
*Waco, Texas*

Get more online Letters about Mark Gibbs' Linux columns. www.nwfusion.com FIND IT ON FUSION 9267

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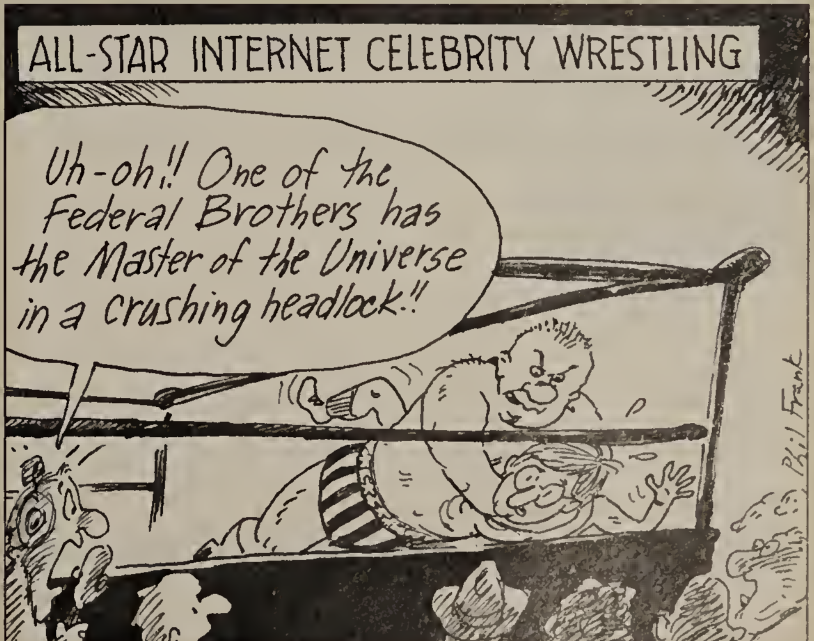
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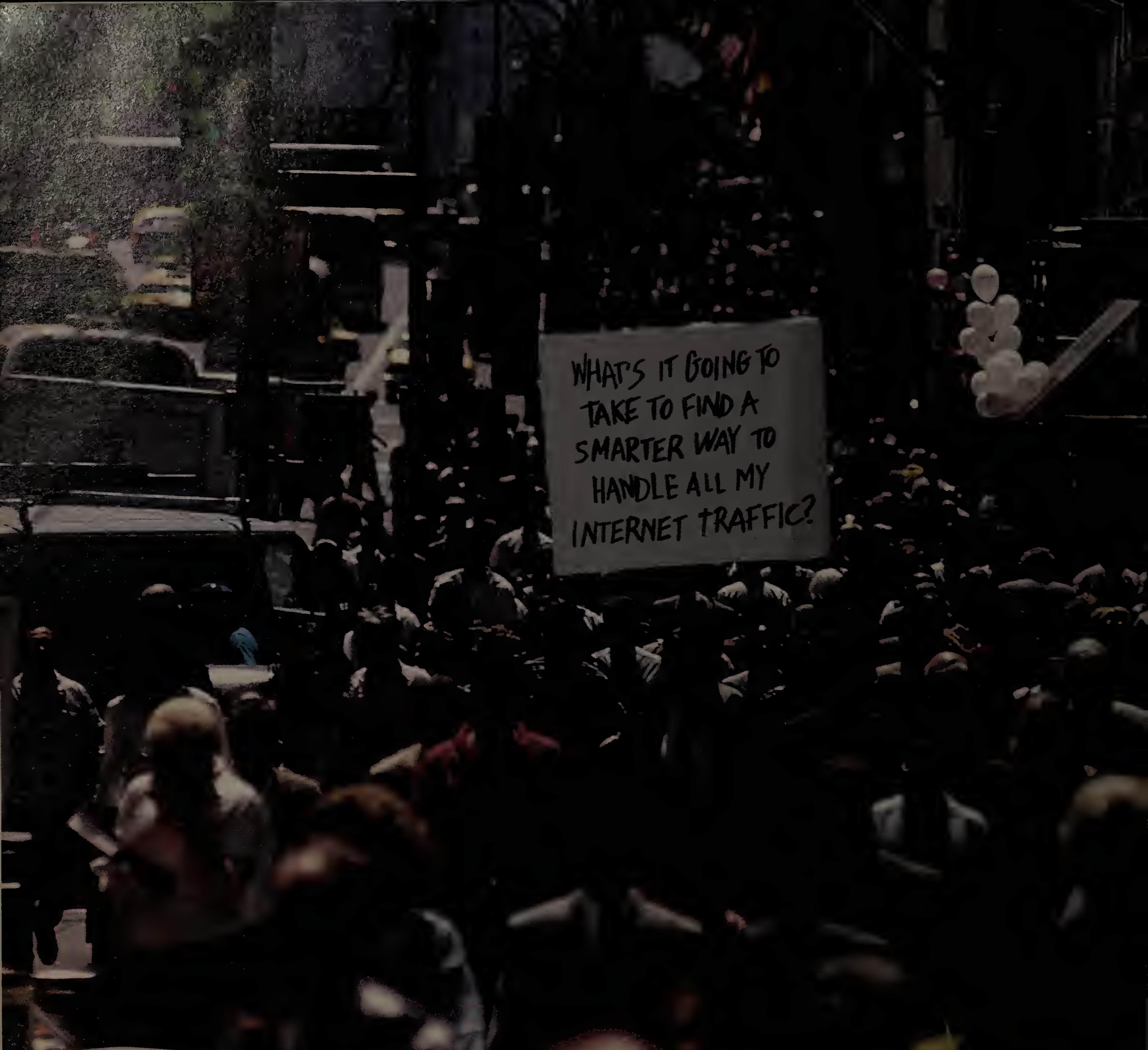
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FACE-OFF

# Linux vs. Windows NT: Which is better for the enterprise?

*Linux is gaining a vocal following of users who say it's reliable, scalable and easy to use. But is it a viable alternative to Windows NT?*

**By Bob Young**

The main benefit Linux offers enterprise users is choice. At Red Hat, we ship a Linux operating system that comes with complete source code and a license that guarantees users the right to do whatever they want with it without so much as asking our permission.

In other words, users have control over the technology they are using. Bug fixes and upgrades are available within hours rather than years, resulting in more stable and reliable computing systems.

Is Linux the best choice for the enterprise? Well, that question begets the question, "What does the enterprise want to do?" If an enterprise wants to run mission-critical applications on industry-leading database engines from Oracle, Informix, Sybase or IBM; launch rockets; render graphics for films such as "Titanic"; or simply wants a rock-solid operating system with consistent uptime, then yes, Linux is the best choice. Just ask Linux-using enterprises such as Los Alamos National Labs, NASA, Nortel Information Network, Digital Domain, Southwestern Bell and the city of Garden Grove, Calif.

When Intel and Netscape recently made a minority investment in Red Hat, they added not only monetary value but credibility and reliability to Red Hat Linux. What it proves is what we at Red Hat have known all along: That Linux reflects the future of technology. Their investment was in Linux, both as an operating system and as a development model.

The investment from Intel and Netscape has given us the opportunity to establish an Enterprise Computing Division within Red Hat Software. This division offers the operating system platform service, technical support, strategic alliances and company responsibility that the enterprise demands.

How can a free operating system that apparently has no money behind it compete with products from the world's richest computer software companies? Appearances can deceive. There are huge amounts of money being invested in Linux development: Companies such as Oracle, Corel and Sybase invest directly in Linux via the best-selling applications they have been porting to the operating system. The software development teams at enterprises such as CERN, NASA, Boeing and Westinghouse contribute by improving the open source products they are using for internal projects.

The huge development effort behind Linux means the technology can stay ahead of closed-system operating systems. Consider security, for example. Because of the wide-open nature of Linux and its sources, security issues are identified, debated and repaired in real time, resulting in more effective solutions that are available immediately.

Given the choice, control, development, services and support Red Hat Linux offers users, the question isn't whether Linux is the best choice for the enterprise — it's how can legacy proprietary operating systems survive in an open source world?

*Young is chairman and CEO of Red Hat Software, a Linux software development company in Research Triangle Park, N.C. He can be reached at bob@redhat.com.*

**By Ed Muth**

One key advantage of Windows NT Server is its user-friendliness. Broad support for standard hardware devices and consistent graphical user interfaces make it easy for users to set up and maintain Windows NT Server. This ease of use is one of the reasons so many companies are making Windows NT Server their Internet and intranet business platform. According to Netcraft (www.netcraft.com), Windows NT Server hosts more Web sites than any other single operating system.

Windows NT Server has succeeded, in part, because it has been designed and tested as a system, relieving companies from having to spend time and money integrating necessary system services. For example, security services such as secure authentication, access control and public-key infrastructure are integrated into Windows NT Server. This allows developers to focus on building applications without having to become security experts. As a result, organizations benefit from a single, secure sign-on across their operating systems and applications as well as a single directory of users to manage.

By delivering an integrated server platform, Windows NT Server provides the infrastructure, application services, traditional network operating system features and communications services that companies need to build business applications. For instance, through mature services such as the Component Object Model, Windows NT Server provides a long-term application architecture for developers and independent software vendors. This results in more business applications for users to choose from.

Finally, Windows NT Server has the benefit of wide industry support. Microsoft invests more than $1 million per working hour — more than $2 billion per year — on research, development and channel programs to enhance the enterprise capabilities of its products. Companies such as Intel, Hewlett-Packard, Compaq, IBM and Cisco are investing billions of dollars in enterprise products based on Windows NT Server.

The richness of the platform and collaboration with industry leaders pays powerful dividends. According to tests submitted to the Transaction Processing Performance Council (www.tpc.org), Windows NT Server provides the best price/performance of any platform in the industry. In addition, to help ensure that customer deployments are successful, more than 250,000 Microsoft Certified Professionals are trained to support and provide value-added products for Windows NT.

Windows NT meets traditional customer requirements for enterprise operating systems, such as scalability, interoperability, availability and manageability, while enabling whole new classes of applications. Windows NT today and the Windows 2000 operating system in the near future provide the infrastructure for the next generation of business solutions.

*Muth is group product manager for Microsoft's Enterprise Marketing Group. He can be reached at (425) 882-8080.*

**Go online to air your views on this issue in our Fusion Face-off running through Nov. 20. Young and Muth will be adding their thoughts to the discussion.**

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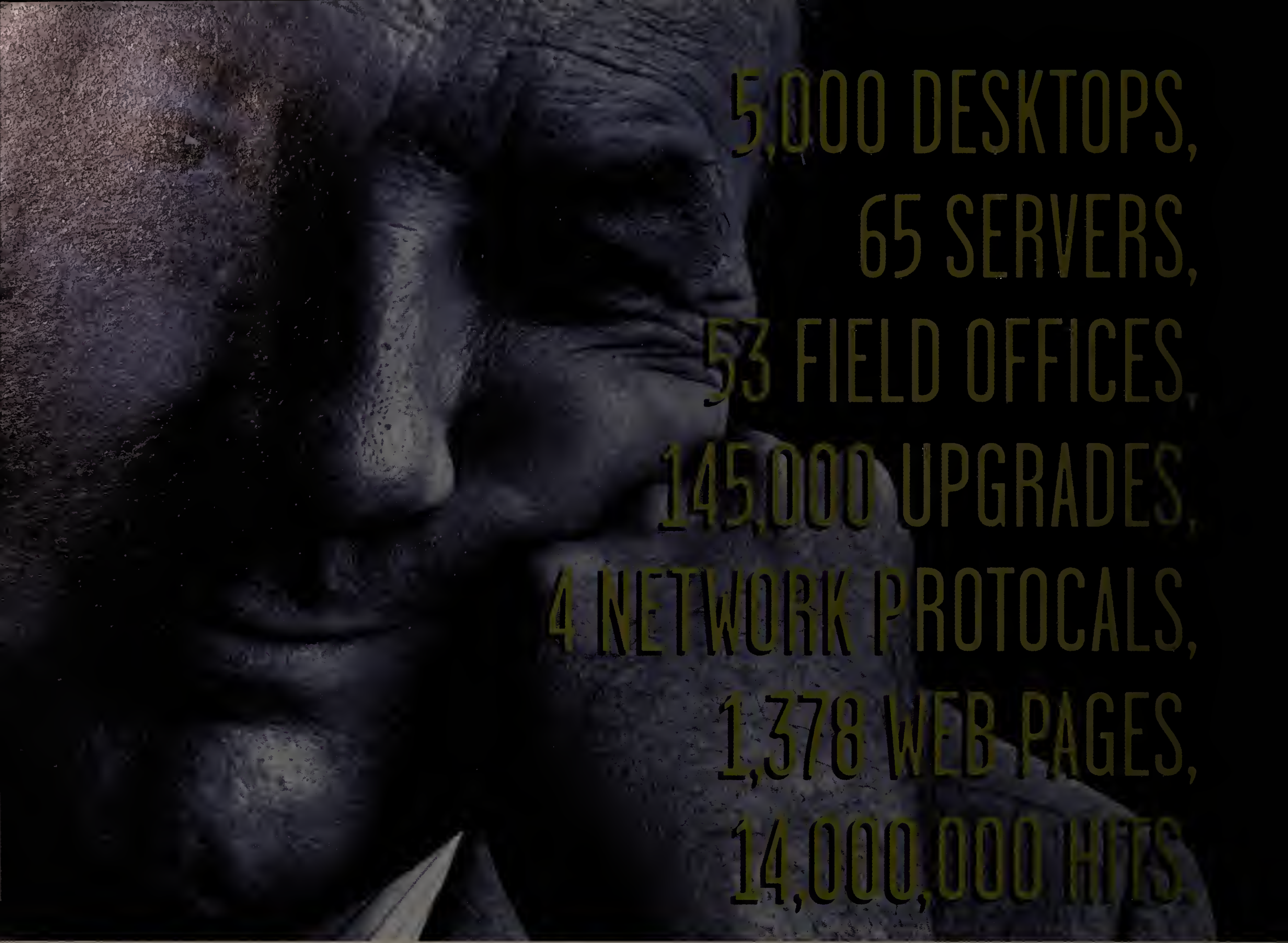

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# Can't get enough DSL

*Early implementers tout the easy installation and attractive pricing of digital subscriber line service — when they can get it.*

By Susan Breidenbach

Early digital subscriber line (DSL) adopters, for the most part, give the service top marks, but they have one complaint: DSL needs to be more widely available.

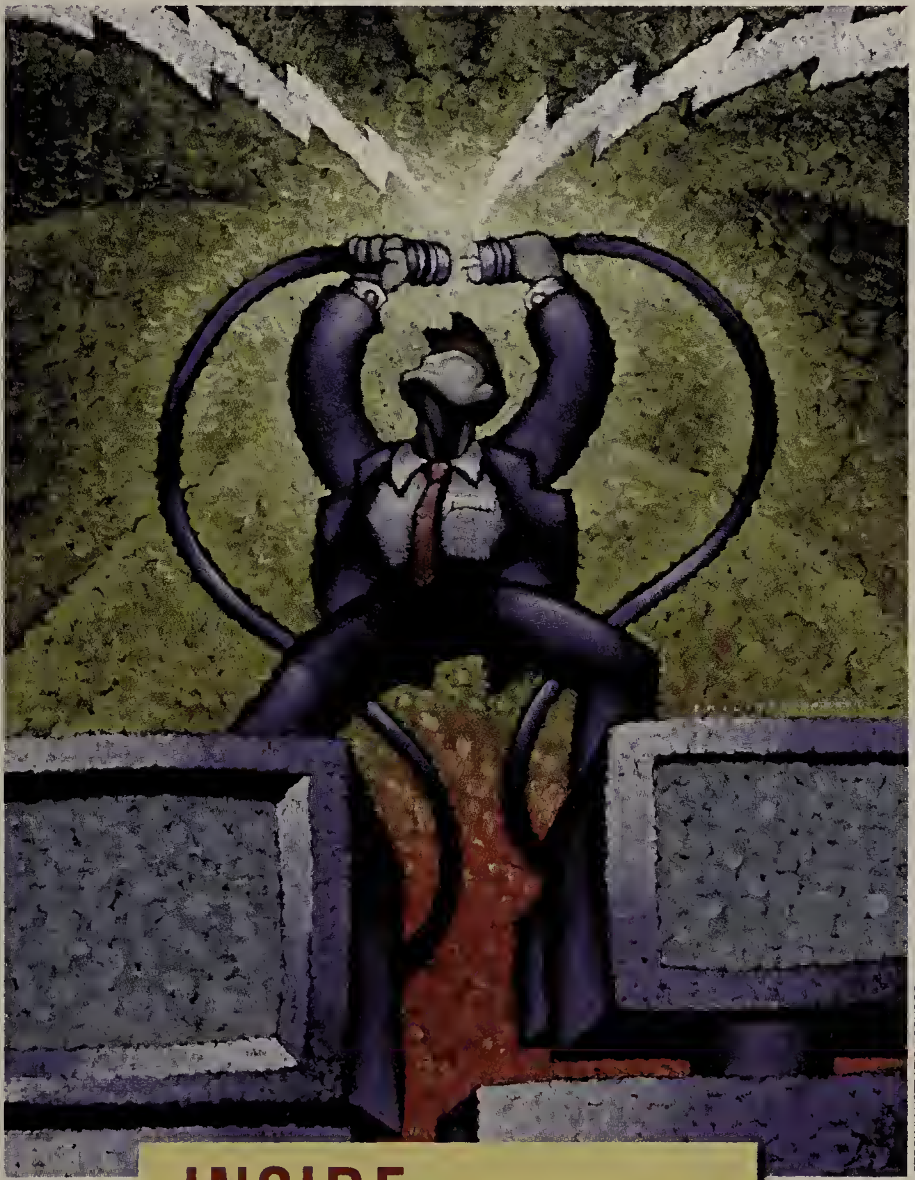
According to telecom consulting firm TeleChoice, only about 825 of the 32,500 central and remote telephone company offices in the U.S. offer DSL; that's about 2.5%. The 825 central offices represent 20 million subscriber lines, but not all of them have been — or in some cases even can be — conditioned for DSL.

Claudia Bacco, a senior DSL analyst with TeleChoice in Dallas, estimates that 50% to 60% of all the copper loops in the country can ultimately support DSL.

Where DSL can be supported, it's a safe bet users will want it. Driven by pent-up demand for high-speed access to corporate networks and the Internet, small offices and telecommuters are snapping up DSL bandwidth as fast as carriers and service providers can provision it.

Cheaper than T-1 and faster and often less expensive than ISDN, the highly reliable technology puts a continuous connection within reach of many who couldn't afford one before. DSL is easy to install and even easier to upgrade. Instead of requiring hardware or software changes at the customer site, carriers can provision higher speeds with a flip of the switch.

Given the user demand, the relative ease of provisioning and the myriad potential providers, it appears there's no need to worry that DSL might parallel the slow and troubled deployment history of ISDN.



STOCK ILLUSTRATION SOURCE

INSIDE:

**The DSL pricing picture.** Page 56.

**A field test of Paradyne's Hotwire MVL, a new flavor of DSL.** Page 59.

**A lab test of MVL for the best-case scenario.** Page 60.

**Speedy video**

Vazda Studios of Birmingham, Ala., recently began using DSL to expand its business beyond the local area. The post-production facility assembles various elements into digital video television commercials and has traditionally kept local courier services busy exchanging computer disks and VHS cassettes with the firm's clients. One small graphic component might be 10M bytes to 15M bytes, making transmission via modem too slow to contemplate, says Bob Askew, chief engineer at Vazda.

Askew experimented with asymmetric DSL (ADSL) at his home when BellSouth began testing the service early this year. He then implemented ADSL in the office when the technology became commercially available this fall. Now customers can send Vazda graphics via the Internet, with DSL speeding up downloads.

Vazda gets ADSL from WWISP, a local ISP that resells BellSouth ADSL service. WWISP charges about $250 per month for a line with a maximum speed of 1.04M bit/sec downstream and 256K bit/sec upstream, Internet access, a static IP address and DSL router rental.

Askew's only real complaint is that BellSouth's DSL deployment to date is limited to DSL.Lite, a slower version of ADSL based on the new G.Lite standard.

"Right now, when we finish a commercial we have to make a VHS tape and use a courier to deliver it to the client for approval," Askew says. "If we had 8M bit/sec bandwidth combined with MPEG compression, we could let clients retrieve the video from our server for review." This would save time and let the company expand its client base geographically.

Like Vazda, many other early implementers are enjoying the benefits of DSL. "It's been incredibly easy to implement — almost plug and play," says Gary Welsh, president of Welsh Consulting, a network integrator in Boston. Welsh has helped the ISP Shore.Net deploy the service to some of his clients.

Carl Hu, the group program manager for Microsoft's public network projects team, is already spoiled by ADSL. Microsoft began testing GTE's DSL services more than two years ago, and now has about 1,000 employees using ADSL lines to telecommute to corporate headquarters in Redmond, Wash. Speeds range from 1M bit/sec to 6M bit/sec downstream and from 64K bit/sec to 2M bit/sec upstream.

But Hu recently moved from a house across the street from the GTE central office that serves the Microsoft campus to a new home on a different GTE loop. He's back in dial-up mode and chafing under the bandwidth constraints.

### Implementation advice

Many DSL problems were ironed out during extensive pilot tests over the past few years, Hu says. Applying lessons he learned from Microsoft's DSL rollout, Hu advises telecommuters to ensure the IP stack in their PCs is configured to use the Dynamic Host Control Protocol and their service providers are set up to support DHCP.

Simply determining whether you can get DSL at a particular location may be your biggest implementation problem. Some phone companies have databases with availability information on their Web sites, but the databases are often wrong, says Robert Palmer, president of Problem Solvers Interactive, a computer consultancy in Birmingham.

If you're fortunate enough to live in an area where DSL is available, examine all the service options before you choose one. Be sure to avoid unnecessary equipment rentals, read the fine print about performance and shop around if you need a static IP address.

Page Law Firm in Birmingham jumped onto the DSL bandwagon this year to speed online legal research. The company replaced dial-up ISDN access and dynamic IP addressing with an ADSL bundle from WWISP that includes a static IP address.

HUGH HUNTER

**Bob Askew** *of Vazda Studios likes being able to use ASDL to exchange large graphics files with clients. But he wishes BellSouth would offer a faster flavor of DSL.*

"We were initially set up with a router that cost an additional $130 a month," says Rick Honsberger, Page's network administrator and president of its Controllex subsidiary, which develops case management software. "I suspected that since we had a proxy server, we didn't really need a router, and that turned out to be true."

For $140 per month, Page gets a maximum bandwidth of 1.5M bit/sec downstream and 256K bit/sec upstream, a DSL modem and one static IP address.

"We're experiencing close to maximum speeds during off-peak hours, but only about a quarter to half of that when the network is busy," Honsberger says. Even so, "the speed is wonderful."

Some carriers don't offer static IP addresses with DSL services, which might be part of their attempts to protect T-1 revenue. If you need a static IP address for your site, check with alternative service providers and compare rates.

However, static IP addresses raise security concerns because DSL is a persistent connection. The door is always open, and you're sharing a router port at your service provider's facility with other customers. Unlike plain old telephone service and ISDN lines, DSL doesn't provide a secure point-to-point connection. And a permanent address makes it easier for cybercrooks to find you.

In single-user telecommuter installations, it's best to stick with dynamic addressing. Also, keep in mind that today's desktop operating systems have a lot of built-in network capabilities. Hackers can use these facilities to gain access to Internet-attached PCs, so be careful how telecommuters' hard drives are set up for sharing, and limit the availability of IP ports.

It's not possible to disable sharing mechanisms in LAN environments, so heavy-duty firewall protection is essential. "Don't put your firewall/proxy server in the same box as your main file server because you don't want that server on the Internet," Palmer cautions. "A lot of people are doing that and don't realize what can happen." To plug this hole, Problem Solvers Interactive developed a Linux-based firewall that can double as a router and connect up to 253 devices to a DSL line.

### A grain of salt

Despite the glowing reviews of DSL services, there is still a lot of uncharted territory. Performance is great now because there aren't many subscribers, but it remains to be seen whether users will be able to get near the maximum bandwidth rates as new users pile onto DSL nets.

DSL coverage is still scanty, especially as you move away from big metropolitan areas. The new G.Lite standard for ADSL may help the technology proliferate because it's easier to install. However, there are still several issues to resolve.

"G.Lite could allow for more rapid ADSL deployment because the phone companies wouldn't have to send a technician out to install splitters at every residential or business account they want to open," says Lisa Pelgrim, a senior analyst with Dataquest, a market research firm in San Jose, Calif. "But it's still in a test mode or early adoption phase."

DSL is also by definition a copper-only technology that can't be deployed in subloops that are connected to the central office via fiber. Service providers are coming up with hybrid ISDN/DSL services, called IDSL, to address this problem, but IDSL falls far short of full DSL capabilities. For example, the maximum speed of an IDSL connection is 144K bit/sec.

Availability problems, coupled with standards issues and the lack of a single national DSL provider, make it difficult for a large organization to implement DSL networks. "If you're a network manager in a big company, you don't want to deal with a lot of different providers and manage a lot of different types of services," Pelgrim says.

Moreover, while DSL users so far report smooth sailing, these trial populations are generally skewed toward the more tech-savvy users. And early adopters tend to get lots of attention and handholding from vendors and service providers.

"If the service provider comes in and does all the customer-premise installation and configuration — opens the PC, installs the Ethernet card and configures the software — that's one thing," TeleChoice's Bacco says. "But if they just install the line and leave all the rest of this to the customer, a lot of people are going to have problems."

That said, the entry level for DSL is low enough that you might as well exploit it where it's available, as long as security concerns are addressed.

*Breidenbach is a consultant and freelance writer in San Mateo, Calif. She can be reached at sbreidenbach@usa.net.*

# How much does it cost?

As carriers and service providers experiment with different DSL data rate offerings, pricing is still being sorted out. For example, Pacific Bell's entry-level package is $59 per month for a 384K bit/sec downstream and 128K bit/sec upstream asymmetric digital subscriber line (ADSL) line, plus $30 for Internet access. US WEST's basic offering is a symmetric 256K bit/sec connection priced at $40 per month plus $19.95 for Internet access.

BellSouth offers one of the best deals with 1.5M bit/sec downstream and 346K bit/sec upstream ADSL plus Internet access for $59.95 per month. BellSouth customers who are already subscribing to certain phone service features get a $10 per month discount.

Some DSL providers base their flat rates on some maximum amount of data you can move through the line each month — 100M bit/sec, for example — and charge you for usage after that point. And finally, DSL pricing partly depends on competition in your area, and prices tend to be lower in areas where cable TV firms are aggressively deploying cable modems.

**— Susan Breidenbach**

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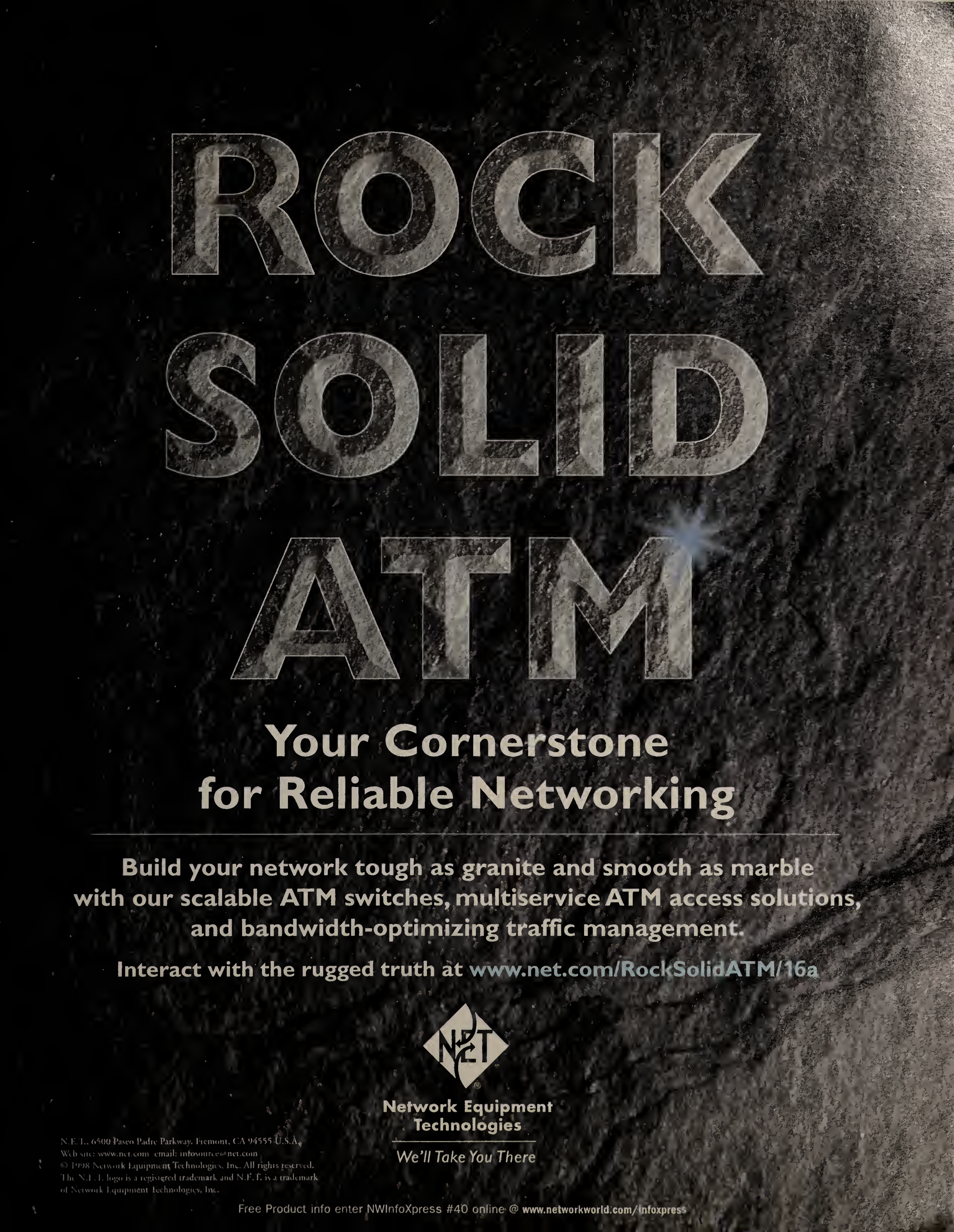

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# DSL in the real world

*Paradyne's MVL technology does away with splitters, but still leaves you at the mercy of your phone company.*

By Lee Schlesinger

Sometimes technology that looks hot in the lab fizzles out in the real world. That's why we tested one of the promising new digital subscriber line (DSL) products, Paradyne's Hotwire Multiple Virtual Lines (MVL) modem, under controlled conditions (see story, page 60) and in our own offices.

### Net Results

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**PROS**

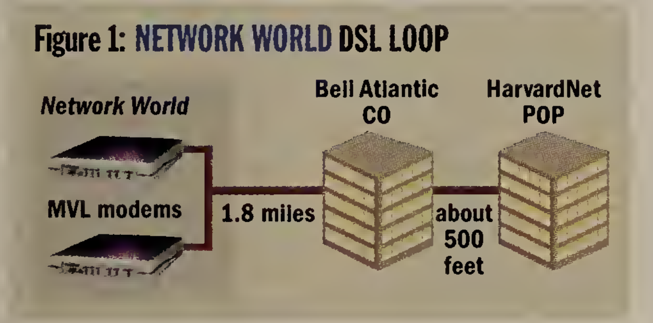
- ▲ Simultaneous voice and data transmissions
- ▲ Supports multiple drops off a single trunk line
- ▲ Good performance even on noisy lines

**CONS**

- ▼ Not standard-compliant

For our trial under normal work conditions, we hooked up with HarvardNet, an early DSL provider that deployed its first DSL installation in early 1996. We used Paradyne's Hotwire MVL modems and worked closely with Paradyne, which itself works closely with HarvardNet. Bell Atlantic provided the service, installed our jacks and connected our office to HarvardNet's point of presence (POP) (see Figure 1).

**Figure 1: NETWORK WORLD DSL LOOP**



Paradyne's MVL is a proprietary implementation that doesn't comply with underlying DSL standards such as Carrierless Amplitude Phase and Discrete Multi-tone. Instead, it uses something called Quadrature Amplitude Modulation, a method of encoding bits borrowed from high-speed analog modems. As a result, it's not compatible with G.lite splitterless equipment and interoperates only with other Paradyne equipment on a service provider's premises. Though this is a drawback, standards in this market have not settled down, and universal interoperability is not as critical as finding technology that works. Additionally, by not complying with standards, Paradyne was able to add to its product features that are incompatible with the standards, including support for as many as four drops off the same trunk line.

### Plug and play

An advantage of the latest generation of DSL technology in general, and MVL in particular, is that it's splitterless. This feature means you don't need an additional device to separate the low-frequency voice traffic on your line from the higher frequency DSL data traffic. You just plug the DSL modem into the wall as you do your current analog modem. Besides a line and phone socket, a DSL modem has an additional socket that you must use to connect to the network interface card of a computer.

The Hotwire MVL modem is designed to plug directly into your existing phone jack and share your current line. Because our office phone system runs through a digital PBX, we had Bell Atlantic install a new line, and the company provisioned it for data only, so we weren't able to test using a phone over the same line that was concurrently supporting data downloads. However, we did hook up our Hotwire MVL using a common phone extension cable and saw no evidence of performance degradation due to electrical interference or poor-quality cables.

Somewhat to our surprise, we liked DSL just fine. The speed of our dedicated hookup — rated at 768K bit/sec combined upstream and downstream — seemed just as fast as the shared T-1 we access over the corporate LAN. We were able to put two computers with different IP addresses (on the same subnet) on two jacks connected to the same incoming line, just as you have multiple phone jacks in your house. The computers were able to communicate over the DSL loop, which connected our *Network World* offices with a Bell Atlantic central office (CO) 1.8 miles away and a HarvardNet POP about 500 feet from the CO.

**Paradyne's Hotwire MVL modem can deliver 768K bit/sec throughput under good conditions.**

### Getting DSL going

As with ISDN service, the most exasperating part of the DSL experience is dealing with the phone company and the service provider to get the configuration right. Fortunately in our case, both equipment and service providers were highly responsive. Nevertheless, it took 26 days from the time we first spoke with HarvardNet to the time we had lines installed and modems that could communicate over them, thanks largely to goofs by Bell Atlantic. The carrier canceled our entire installation order when we only wanted to cancel three of the four original lines they were to install.

Is this technology cost-effective? That depends on the available alternatives. In areas where service is available, cable modems will give DSL strong competition. Our MediaOne cable service, which provides shared 1.5M bit/sec throughput downstream and 384K bit/sec upstream, has nearly as good a response time, and at $50 per month, competes closely with HarvardNet's $59 for 768K bit/sec DSL service or $49 for 384K bit/sec service. (The monthly subscription rate includes use of the MVL modem.) Service areas where IP over DSL and cable are available will likely have the lowest rates.

Cable providers have had 20 years to recoup the cost of building infrastructure and have a cash cow in their TV services to subsidize the Internet side of the business. However, they still have to send out a service representative when they install a cable modem. DSL promises an easier install, but its providers are still building their infrastructure and must dedicate some time and expense to evangelizing the technology.

Both technologies have great potential. Watching the market mature ought to be interesting.

# DSL: Performance under pressure

*Paradyne's MVL modem installs easily and performs well.*

*By John Bass, Network World Test Alliance*

Buyers often greet new technology with skepticism. They've seen too many vendors promise better throughput and easier management, then fail to keep those pledges. Digital subscriber line (DSL) technology in particular has been long on promises and short on delivery. However, we're happy to report that Paradyne's Hotwire Multiple Virtual Lines (MVL) System seems poised to follow through on its potential of simple installation and strong throughput.

We found that MVL can deliver 128K bit/sec throughput even under duress and as much as 768K bit/sec of bidirectional traffic under the best conditions. That throughput level is lower than some other DSL flavors we tested last year (*NW*, Nov. 3, 1997, page 55), but it's well above ISDN speed. MVL also lets you make voice calls over your line without dropping the connection to the Internet.

**Speed and delay**

Paradyne's MVL system comprises modems connected to remote PCs and a DSL Access Multiplexer (DSLAM) based on a telco's premises. MVL allows data and voice transmissions simultaneously over the same twisted-pair wiring. The components negotiate data rates depending on the condition of the DSL loop. The negotiated rate is called the training rate.

MVL modems are easy to set up. You just plug an RJ-11 cable into the phone socket of a line that's been provisioned for MVL service and hook up a second cable between the modem and a network adapter in a PC.

We connected the two sides of our MVL installation through a Consultronics DSL loop simulator. Rather than simply test throughput and latency under ideal conditions, we came up with a test suite that simulated real-world DSL loops under favorable, unfavorable and downright nasty conditions. We called the loops the good, the bad and the ugly. In the real world, customer conditions are better than or equal to these conditions 60%, 90% and 99% of the time, respectively. We then tested three aspects of the MVL equipment: single DSL link performance; on-hook/off-hook transitions; and the running of two modems over one DSL link. In each of our loop simulations, we noted worst-case training rates, which occurred when we injected noise at the receiving end of a traffic stream.

As expected, we achieved the highest training rate while the phone was on hook because all the bandwidth was available for the data channels. On our good link, this scenario resulted in an upstream and downstream rate of 768K bit/sec. The training rate is always in multiples of 64K bit/sec because bandwidth is provisioned in 64K bit/sec chunks.

While the phone was off-hook, we saw a slightly lower training rate of 512K bit/sec upstream and 640K bit/sec downstream because the voice channel slightly overlaps the data channel and takes over when activated. Transmission rates on the data channel are reduced even when no one is speaking. However, user response time is still equivalent to that of a client on a moderately loaded LAN.

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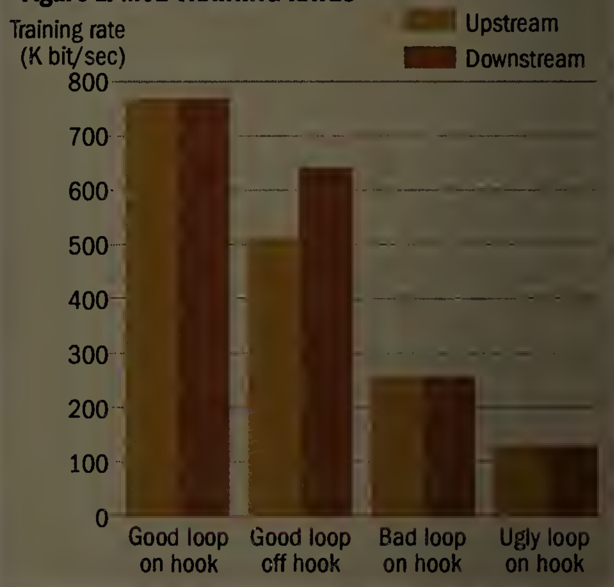
The bad loop yielded a 256K bit/sec training rate in upstream and downstream directions, and the ugly loop trained to 128K bit/sec in upstream and downstream directions. Even though 128K bit/sec is low compared with the maximum allowable training rate of 768K bit/sec, the fact that the equipment was able to train over such a poor loop is a feat in itself (see Figure 1).

**Figure 1: MVL TRAINING RATES**



In our throughput tests, we found a deficit of roughly 5% to 10% in Ethernet throughput compared with the DSL training rate. The shortfall is due to the inherent inefficiencies of converting Ethernet packets to run over the DSL link. We found cases in which Ethernet throughput exceeded the training rate, but that was simply due to buffering. On bidirectional tests we found that upstream and downstream traffic streams perform as designed and share the negotiated bandwidth.

Our tests turned up one surprise: a particularly low throughput for 64-byte packets due to a processing limitation of the DSLAM and modem. The system could forward roughly 500 of these small packets per second upstream and about 1,000 per second downstream.

Paradyne was unaware of this problem, but offered that its modem is optimized for large packets to accommodate the bulk of Internet traffic. The company also speculates that throughput for smaller packet sizes is lower because of factors such as overhead and acknowledgements. At the time we went to press, Paradyne said it corrected the problem in a new software release scheduled to be ready this week. The new code should improve performance for all packet sizes by allowing an increased number of packets to be linked before being transmitted, Paradyne says.

**Watch out for latency**

While throughput rates are important, high device latency can also be a performance-killer. Overall, we found latencies virtually the same for upstream and downstream directions. The equipment had a latency of about 20 msec over the good and bad loops, but as much as five times that over the ugly loop (see Figure 2). That's high compared with other network devices, such as packet switches and routers. In fact, 100 msec is comparable to the latency for a whole cross-country IP path across the Internet. That means on the worst lines users may see Web sites appear more slowly. On typical lines, high throughput would likely make up for any latency lags.

### Score Card

| | Performance (50%) | Features (30%) | Installation (10%) | Documentation (10%) | Total score |
|---|---|---|---|---|---|
| Hotwire MVL System | 9 x .50 = 4.50 | 9 x .30 = 2.70 | 9 x .10 = 0.90 | 8 x .10 = 0.80 | 8.90 |

**Individual category scores** are based on a scale of 1 to 10. **Percentages** are the weight given each category in determining the total score.

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Because MVL's splitterless modems are designed to be used simultaneously with telephones, we tested on-hook to off-hook transition times. When we took a phone off the hook, the bandwidth was greatly reduced and even shut off while the devices negotiated. It took approximately 10 to 12 seconds for the system to stabilize the data channel. This seems a little long, and it would be unacceptable if a phone were picked up and put down often. However, the transition times were predictable, and the system consistently stabilized itself after each disruption.

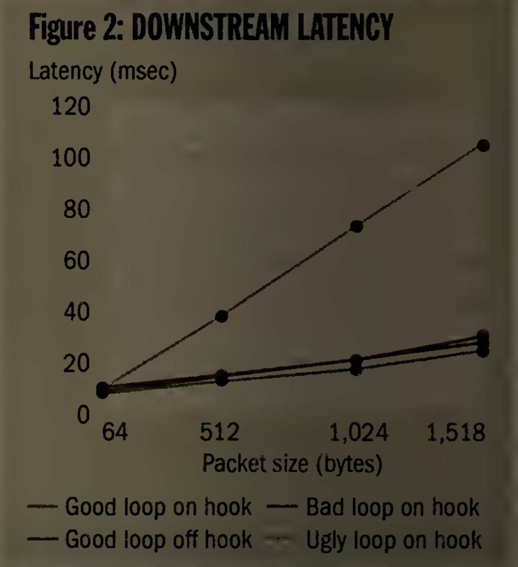
When we simultaneously fed traffic through two modems, the pair worked well together, sharing the traffic streams in a stable manner and dividing the bandwidth between themselves. We found that total bandwidth was less than the training rate because of interpacket gaps, Ethernet preamble bits and collisions.

### Setup

While latency was sometimes a problem, Paradyne's easy installation claims held true. The MVL modem and DSLAM are nothing more than Layer 2 bridges, passing traffic from one physical medium to another. All routing takes place in a CO or, in some cases, in a campus telecommunications room.

To allow differentiation between traffic from the different DSL links, a 10Base-T interface on the DSLAM lets you connect it to a device that supports the 802.3Q standard for virtual LANs over Ethernet.

Figure 2: DOWNSTREAM LATENCY



This feature allows the DSLAM to tag the Ethernet frames for the DSL link the packets are coming from or destined for. Users can choose their own devices to handle routing and other functions. Adding routing is easy when there's only one MVL modem on the loop, but there are few devices available today that can handle multiple 802.3Q streams per port.

Users manage the MVL system through serial and Ethernet interfaces; Paradyne doesn't provide a Web interface for management. You can monitor the training rates, data rates, packet rates and other operational parameters of the modem and the DSLAM.

Paradyne has published all its MVL documentation on the World Wide Web, which makes access easy. However, all the manuals are posted in file form. We'd like to see the documentation also available in HTML to eliminate the need to download and print large files.

All in all, the MVL system is a good performer that can provide DSL service even to subscribers with poor-quality loops. The ability to service multiple modems on each DSL link allows subscribers to forgo Ethernet connections in a small office by using MVL over existing phone cabling. With those benefits, we give Paradyne's Hotwire MVL System a big thumbs up.

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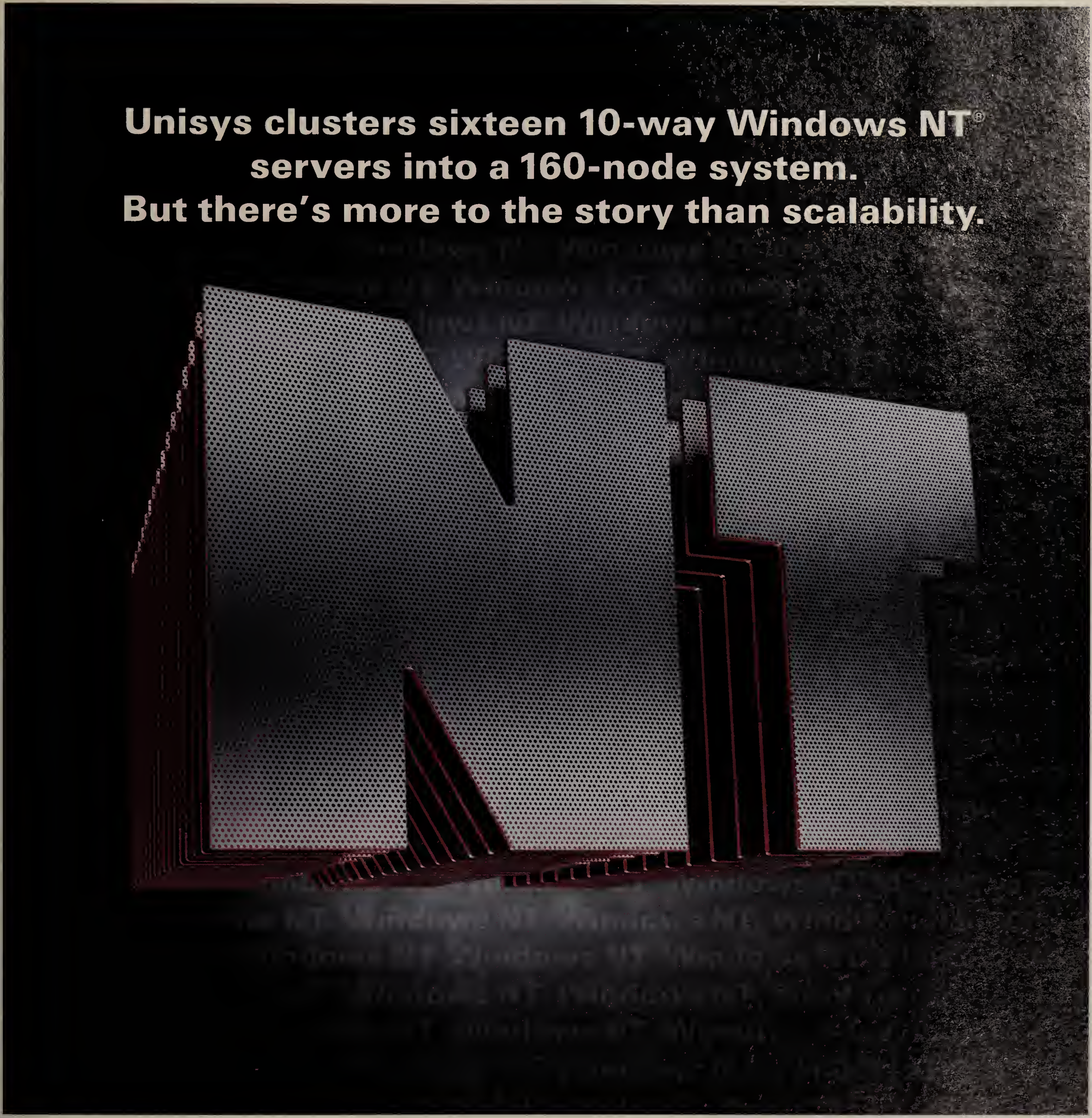
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## *How We Did It*

To characterize the performance of Paradyne's Hotwire MVL System, we simulated three real-world digital subscriber line (DSL) loops we called the good, the bad and the ugly using a Consultronics DSL loop simulator and a Consultronics noise injector.

For the good loop, we simulated a CSA Loop 4, which is a 6,800-foot loop with an 800-foot bridge tap at the customer premises and a 400-foot bridge tap at the central office (CO). Loop 4 consists of standard 26 American Wire Gauge (AWG) wire. Each bridge tap is a branch point on a loop. This loop represents 60% customer coverage, meaning that 60% of customer loop conditions are equal to or better than this scenario. We injected a composite noise of 140 dBm/Hz background noise. The human ear can barely detect this noise level, which ANSI says is representative of high-frequency noise on adequately performing subscriber loops. Because we only had one noise source, we placed it at the receiving end of the traffic for a unidirectional traffic flow and at the CO side of the loop for a bi-directional traffic flow.

The bad loop represents 90% customer coverage. For the bad loop, we adopted a modified ANSI Loop 7, which consists of a 13,500-foot loop with 26 AWG wire and a 1,000-foot 26 AWG bridge tap at the customer premises. We again injected a composite background noise of -140dBm/Hz; and we further increased interference by adding four HDSL, four ISDN and 24 T-1 pairs in an adjacent binder on the loop.

For the ugly loop we simulated a 24,000-foot twisted-pair loop with 24 AWG wire, which represents 99% customer coverage. We injected the same background noise and signal disturbers on this loop as we injected on the bad loop.

For each loop condition, we tested single DSL link performance, on-hook/off-hook transition times and the performance of two modems over a single DSL link.

For single DSL link performance, we designed a five-test suite that measured maximum throughput without loss from the modem through the DSL Access Multiplexer (upstream); maximum throughput without loss from the DSLAM through the modem (downstream); bidirectional throughput without loss; average latency from the modem through the DSLAM (upstream); and average latency from the DSLAM through the modem (downstream). We repeated each test for 64-, 512-, 1,024-, and 1,518-byte packets, and we repeated the test suite over the good loop while the phone was off-hook.

We measured latency using a 100K bit/sec traffic stream for the good and bad loops, and a 20K bit/sec traffic stream for the ugly loop.

Finally, we tested the amount of time it takes to stabilize data throughput when going between on-hook and off-hook states. We also ran a dual-modem test and measured bidirectional throughput without loss to see how the system performs with two modems on one DSL link.

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# Management Strategies

# Career changes

*The hottest crop of newfangled jobs all require Internet expertise.*

By Rivka Tadjer

Just a few years ago, job hunting meant scouring the newspaper for employment advertisements seeking network managers, IS professionals, NetWare experts or Cisco router engineers.

Fast forward to the present. The job landscape suddenly looks like another planet, full of unknown craters and foreign languages. Thanks to the surging growth of the Internet, the hot positions these days are Internet architect, electronic commerce expert, security consultant and outsourcing manager.

These jobs take the traditional responsibilities of network professionals and add a twist. It's all about handling new ways of managing and storing data. This requires proficiency in some areas never before associated with networking, such as programming and interactive database development. Although business and marketing savvy have always paid off, these skills can now make the difference between getting an IT job or not.

While network architects were once responsible for determining how to exchange information within a corporation, Internet architects need to devise ways to share information with the whole world, including employees, business partners and consumers, says Rick Reed, a New Jersey branch manager for Computer People, a high-tech placement firm in Holliston, Mass.

Veteran network professional Hien Nguyen had to update his skills to land an Internet architect job at AT&T's international division in Basking Ridge, N.J. "Since the Internet, electronic commerce and intranets are the focus now, I had to become proficient at not just software, but hardware, database development and Java," he says.

### The basics and beyond

As Nguyen learned, the recent crop of Internet-related jobs requires workers to learn some new tricks. For example, electronic data interchange (EDI) professionals have become today's electronic commerce experts. To get the job, you need to know Web languages such as Java, Perl and the Common Object Request Broker Architecture, plus be familiar with object-oriented methodology, dynamic HTML and C++. You also need to be an analyst who understands which vendors will own the next standard technology.

Not long after entering the IT lexicon, the Webmaster title is already fading into oblivion. The job has morphed into Web innovator, and it suddenly has everything to do with electronic commerce, marketing and interactive database development.

Of all the new IT jobs, the security expert's responsibilities call for the most well-rounded batch of network skills, including expertise in TCP/IP, routers and firewalls. Security experts also need programming skills to implement point-to-point tunneling, database integration, network monitoring and intrusion detection. Programming knowledge also lets security experts show Web designers how to safely use Java applets and Common Gateway Interface scripts, which are notorious for leaving loopholes for hackers.

**Hien Nguyen added Java** *and database development to his bag of tricks to land a job as Internet architect with AT&T.*

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Regardless of Internet-related job title, there are several key skills you really can't do without. You need to understand hardware, software, telecommunications, database development, languages and security systems before you can become competent in one particular area.

Think of it in terms of being a doctor. Physicians need to fully understand the human anatomy to earn a medical degree, requiring knowledge of skin, organs, blood and the brain. Then doctors specialize in one particular area, becoming more and more proficient.

Although acquiring a comprehensive arsenal of network- and Internet-related skills sounds daunting, this expertise could fetch you salaries of up to $250,000. And even if you only have a subset of these skills, you can make more money than ever before.

A network architect may earn $70,000 per year, but database development knowledge will earn an Internet architect $90,000 immediately, Reed says.

The Internet also created a great opportunity for those who were stuck in lower paying jobs. Take a Web innovator: A good graphic designer who knows a bit about developing interactive databases can command a salary of $100,000, while graphic designers earn about $40,000.

### Competing with the kids

Recent college graduates who cut their teeth on Java and database development can pull in $90,000 to $100,000 for Internet-related positions, Reed says. If those paychecks sound attractive to you, flaunt your business skills to compete with these kids. Many recent graduates lack real-world business experience, and that's where you have an edge.

"If you're an expert in any particular kind of business, there is a place for you," Reed says. He also urges seasoned IT professionals to stress their military, government and Fortune 1,000 experience. Employers are looking for candidates who have dealt with large, complex enterprises.

Nguyen declined to reveal his salary, but he says it's more than he was earning at ERA Realtors as a network architect. Even so, he plans to keep broadening his IT knowledge. "I need to get up to speed on electronic commerce, particularly integrating the network with banking and credit card systems," he says.

Nguyen went to a community college to learn Java, then used his job to become proficient in the language. Similarly, he wants to experiment with electronic commerce on the job at AT&T.

If you want to boost your Internet skills and salary, try to get as much as you can out of your current job and take on as many challenging assignments as you can.

*Tadjer is a freelance writer in New York. She can be reached at rivkat@mindspring.com.*

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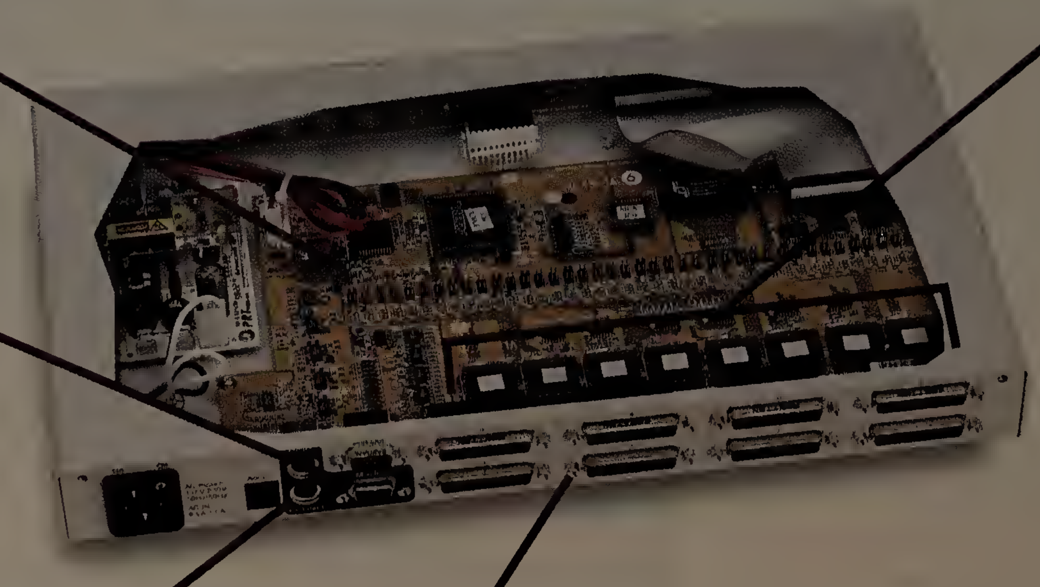

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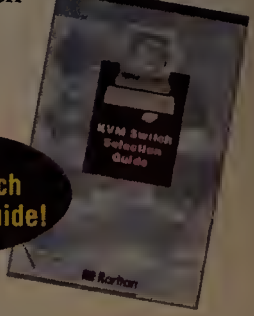

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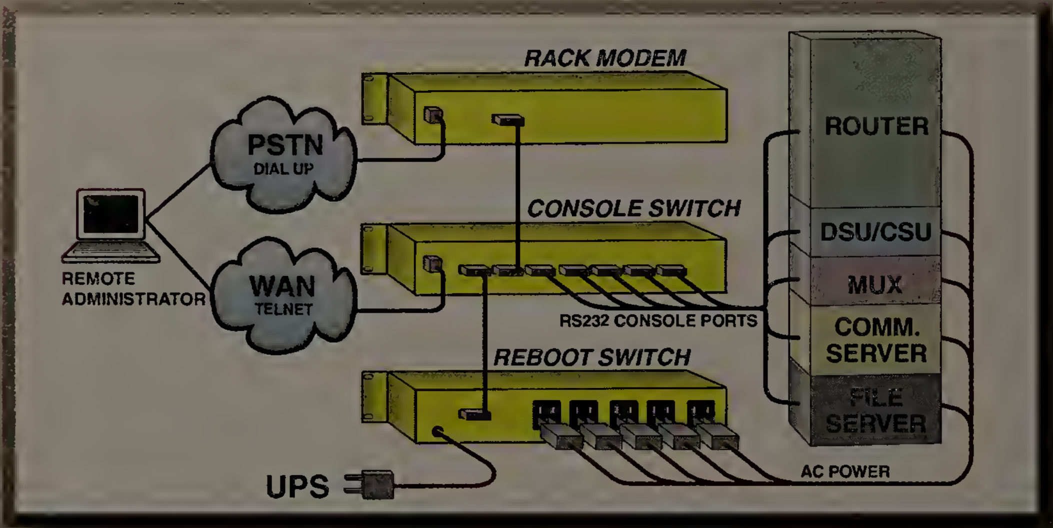

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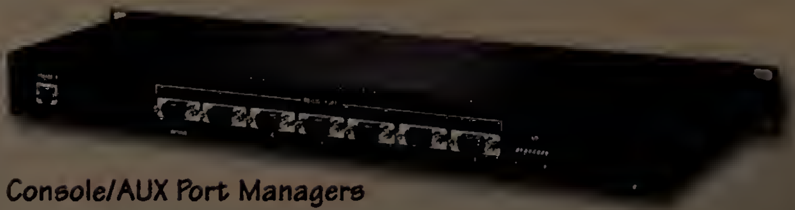

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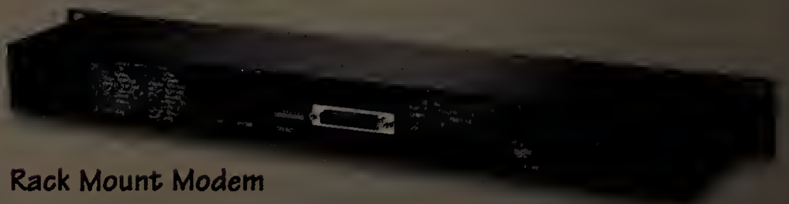

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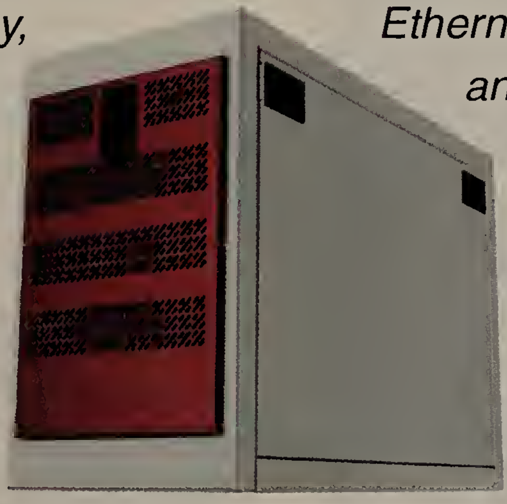

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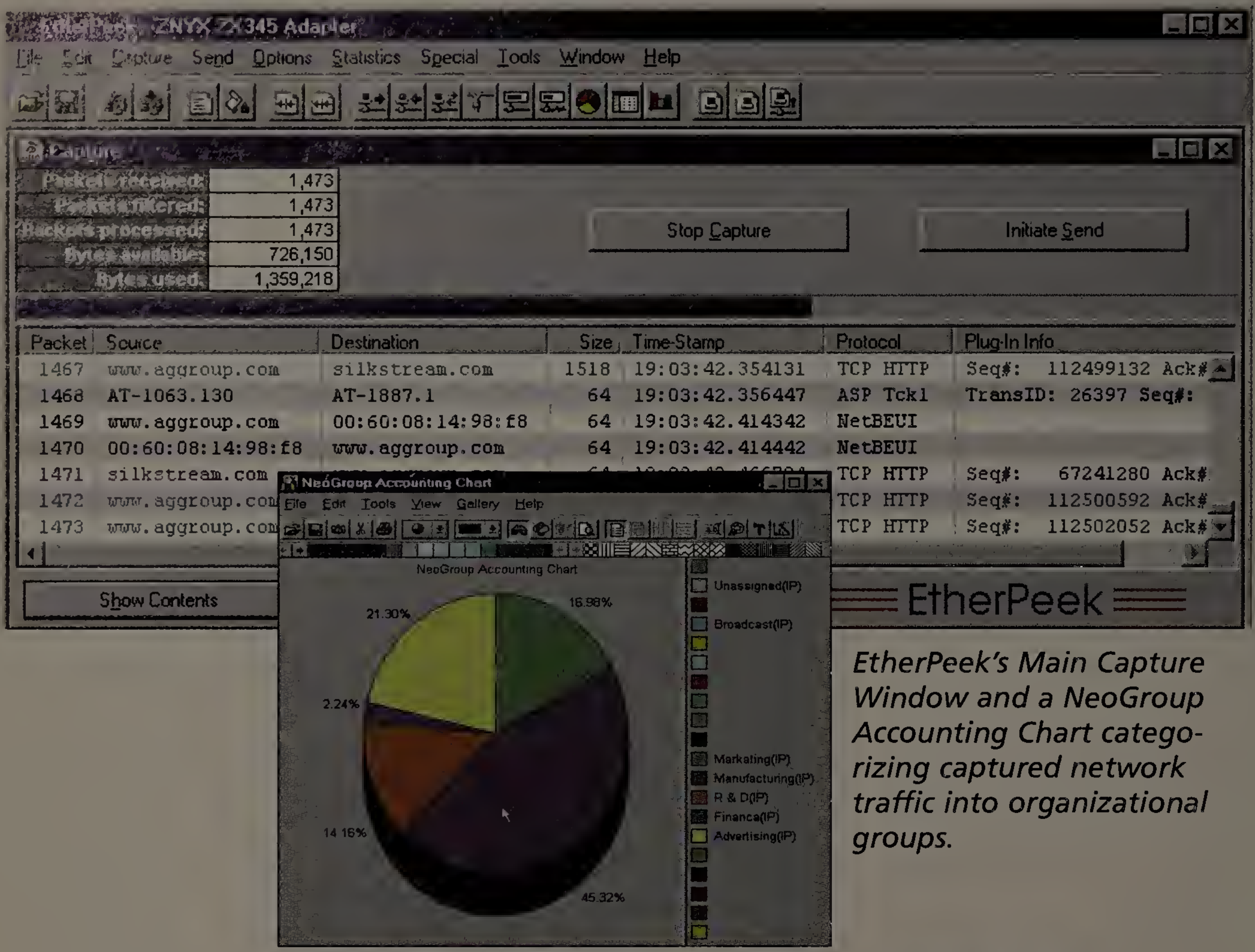

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Packets received:   1,473
Packets filtered:   1,473
Packets processed:  1,473
Bytes available:    726,150
Bytes used:         1,359,218

Packet Source            Destination        Size Time-Stamp          Protocol  Plug-In Info
1467   www.aggroup.com   silkstream.com     1518 19:03:42.354131     TCP HTTP  Seq#:  112499132 Ack#
1468   AT-1063.130       AT-1887.1            64 19:03:42.356447     ASP Tckl  TransID: 26397 Seq#:
1469   www.aggroup.com   00:60:08:14:98:f8    64 19:03:42.414342     NetBEUI
1470   00:60:08:14:98:f8 www.aggroup.com      64 19:03:42.414442     NetBEUI
1471   silkstream.com                                                TCP HTTP  Seq#:   67241280 Ack#
1472   www.aggroup.com                                               TCP HTTP  Seq#:  112500592 Ack#
1473   www.aggroup.com                                               TCP HTTP  Seq#:  112502052 Ack#
```

*EtherPeek's Main Capture Window and a NeoGroup Accounting Chart categorizing captured network traffic into organizational groups.*

AG Group's award-winning EtherPeek is an accessible, affordable, and powerful protocol analyzer and packet debugger. Available for Windows 95/98/NT 4.0, EtherPeek sets the industry standard for ease-of-use, making the complex task of monitoring and troubleshooting mixed-platform, multi-protocol networks simple and straightforward.

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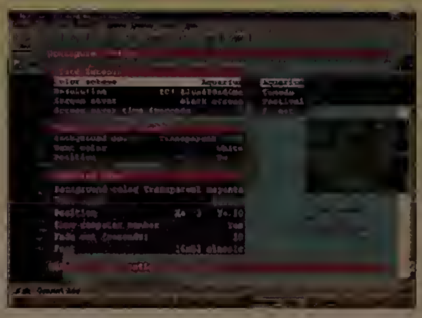

On-screen display menu–This screen shows the overlay menu with the selection for the color scheme popped up.

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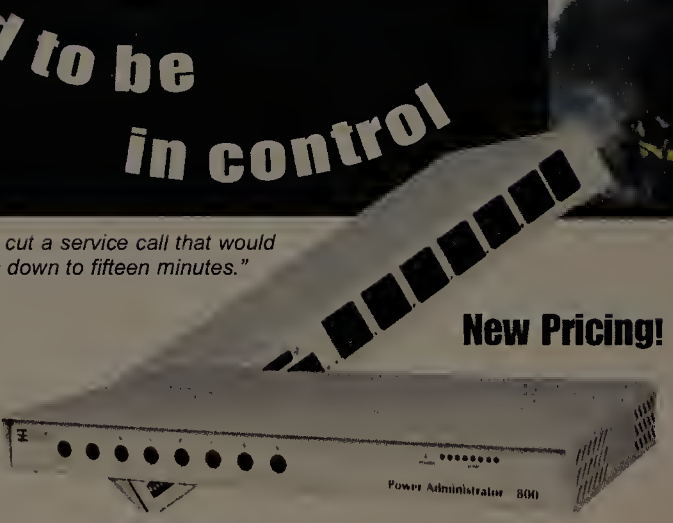
*AlphaNet Telecom, Inc.*



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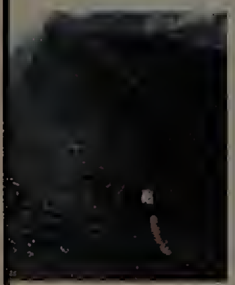

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3. Stop the service *(wait a while)*
4. Go to the account information screen and change the information
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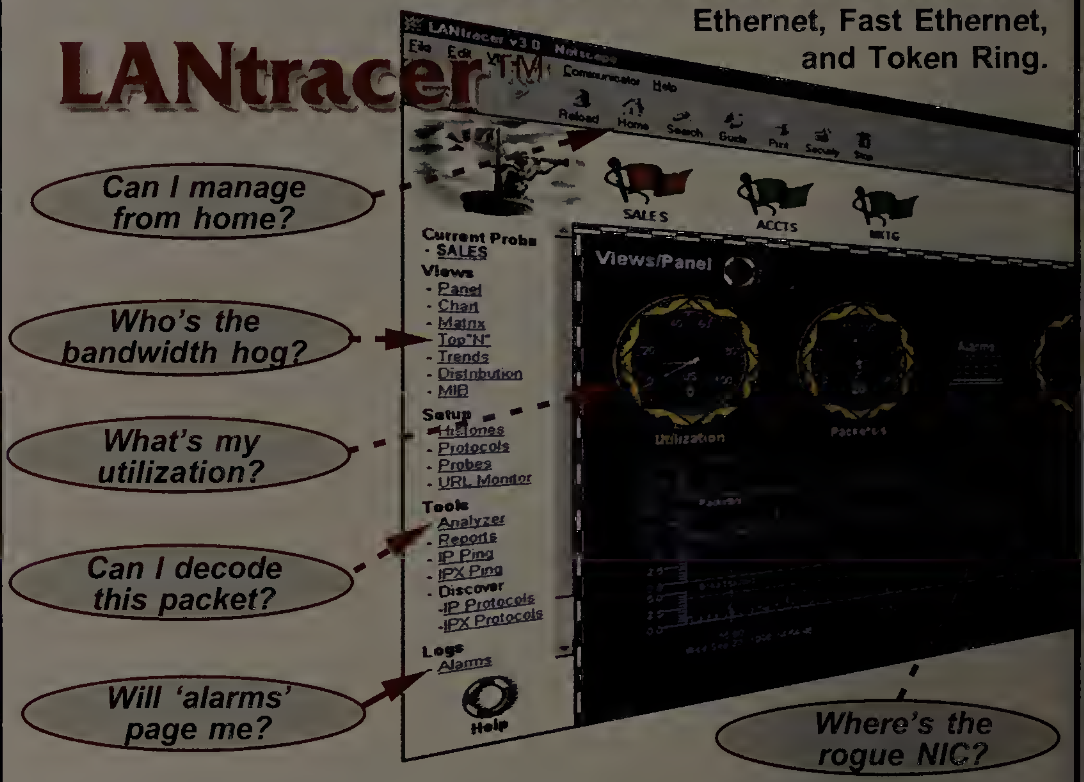

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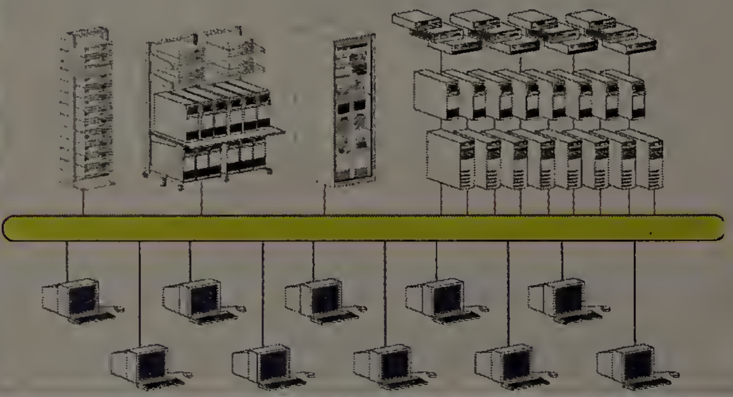

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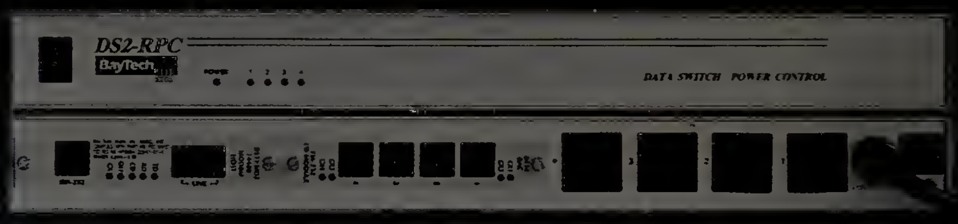

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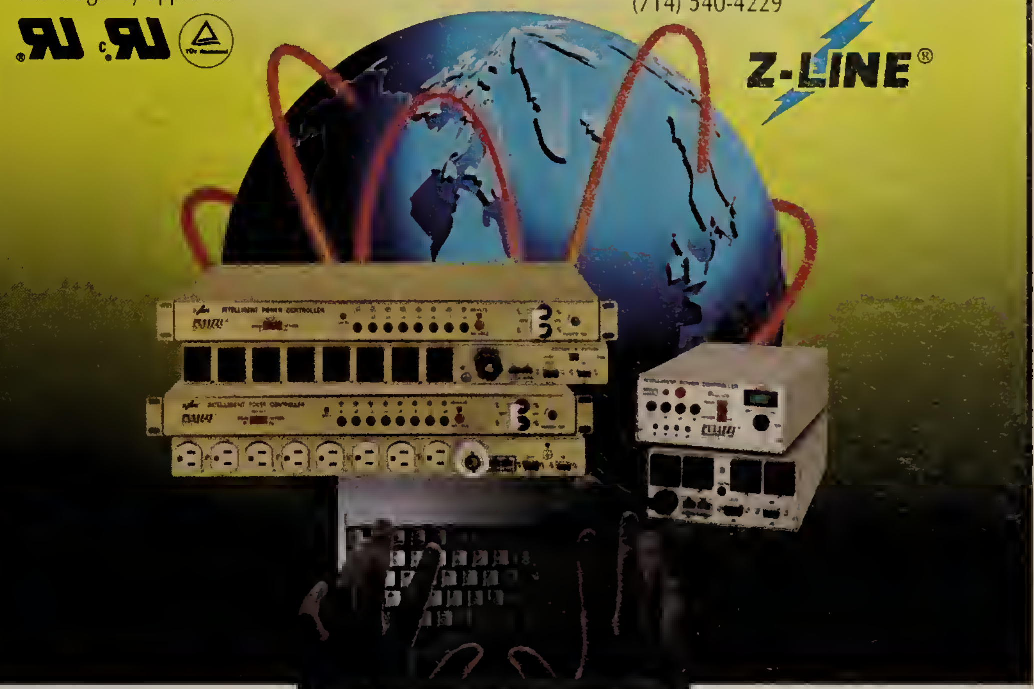

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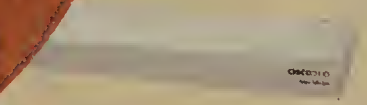

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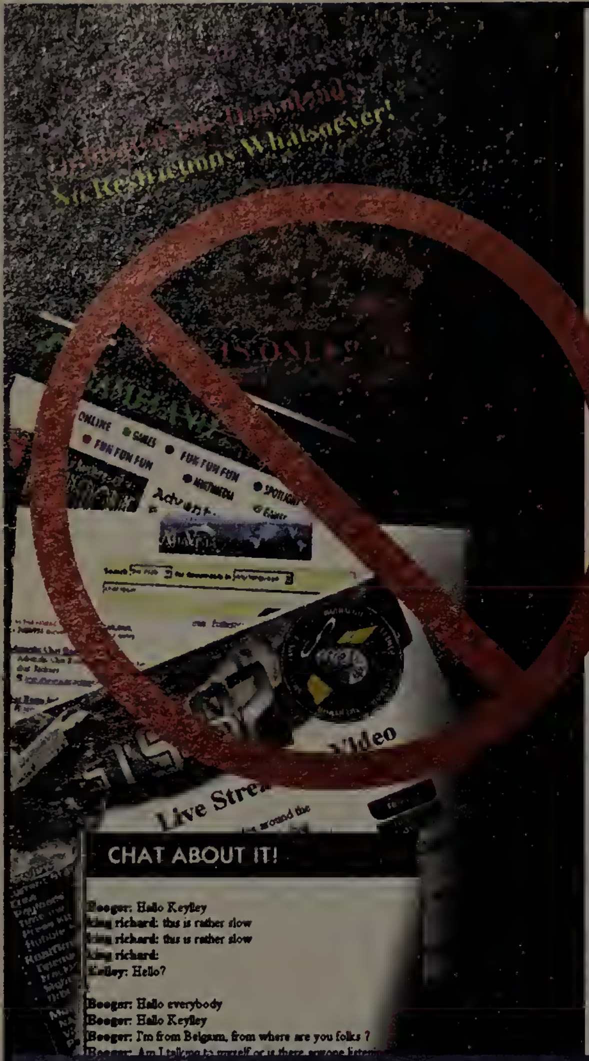

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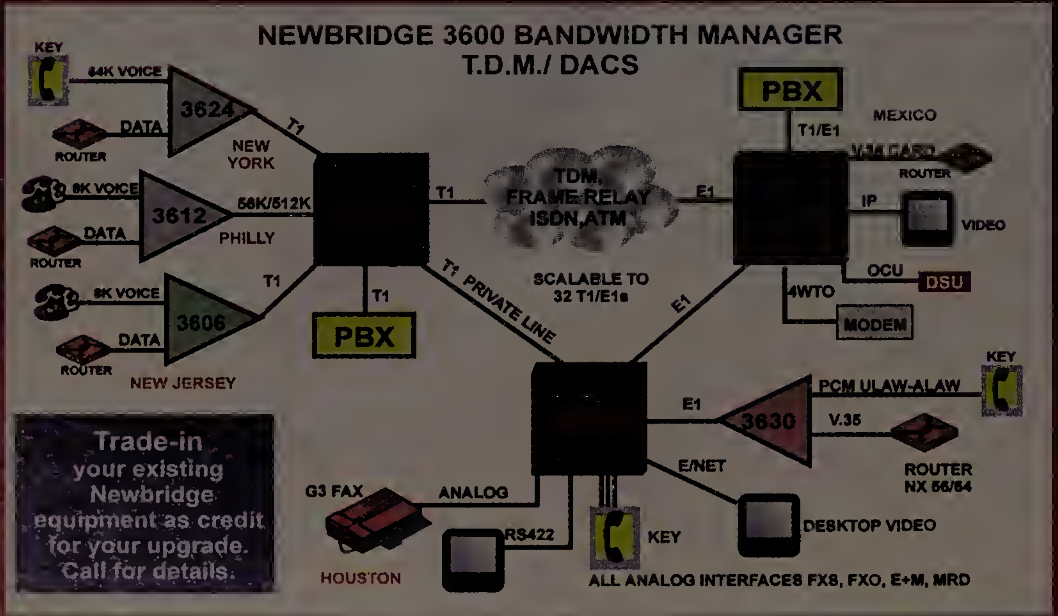

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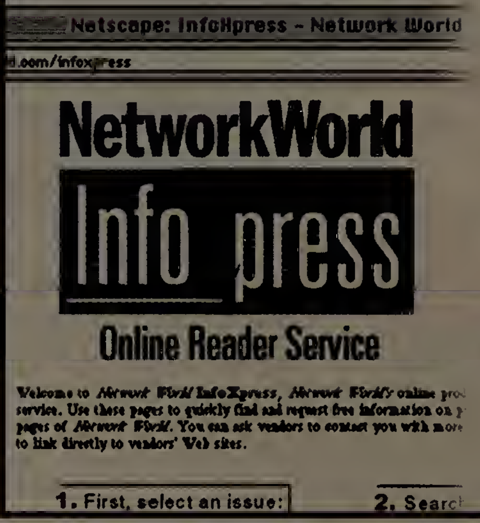

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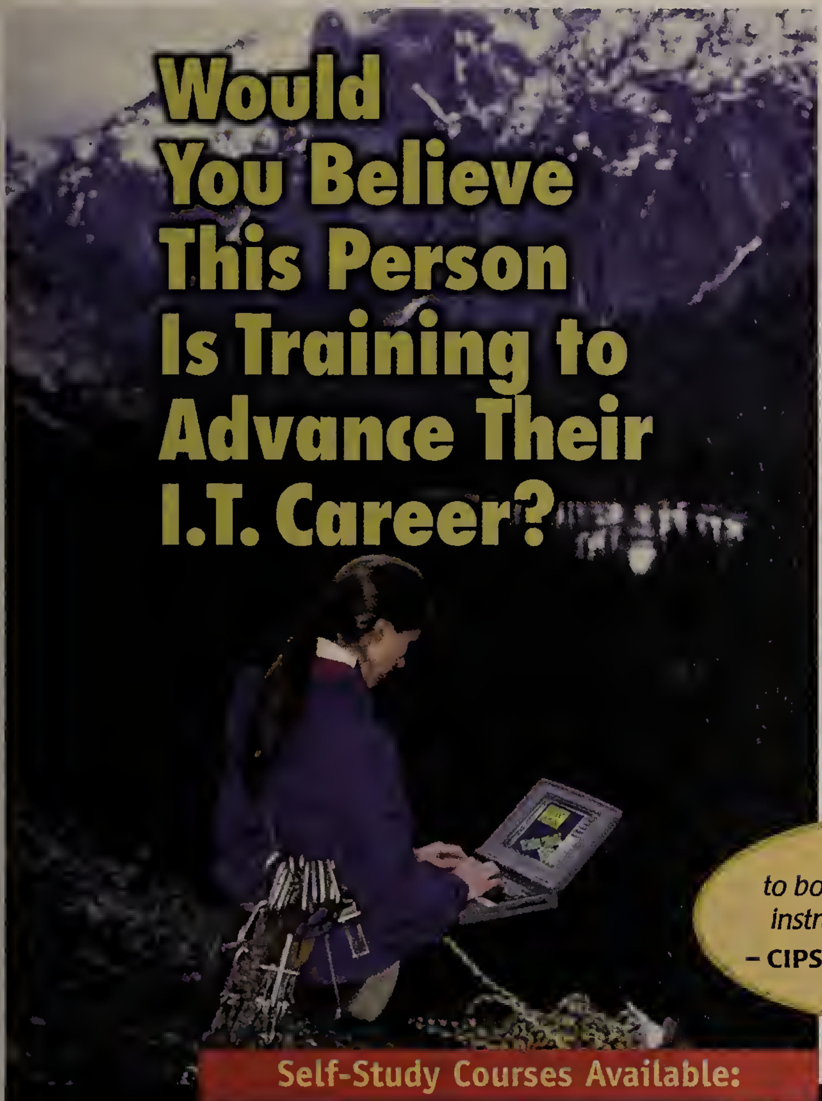

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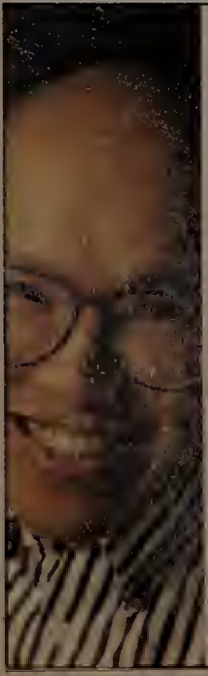

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# XML

*Continued from page 1*

another without having to rewrite or reformat the data. With XML, you create tags around data fields that describe what that data is and how it's used.

For the enterprise, widespread XML development holds out the promise of formatting data that will never have to be ported to another environment, says Simon Phipps, IBM's chief Java and XML evangelist.

XML uses Document Type Definitions (DTD) to describe the tags and attributes that are valid within an XML document. The use of DTDs will enable different vendors, customers and users to read each other's XML-tagged data. DTDs are currently being written for a variety of vertical markets, including banking, government, education and publishing.

As part of the XML effort, IBM is releasing:

- XML Bean Maker, which generates JavaBean classes for a DTD, easily allowing a programmer to create classes and objects from XML documents.
- Dynamic XML with Java, an XML annotation language that adds dynamic behavior to XML for server-side Java and Java-based workflow applications.
- XML Editor Maker, a Rapid Application Development tool that automatically builds a visual Java editor, which is used to edit XML documents based on a user's customized DTD.
- Datacraft, an application development/database tool that lets information stored in databases be viewed and published in XML.
- PatML, a pattern match and replacement tool for transforming XML documents into non-XML documents.
- BML (Bean Mark-Up Language), an XML-based language for accessing and configuring, creating and calling methods in JavaBeans. A method defines what an object can do.
- TeXML, which provides a way to convert XML to a printable format.
- XML TreeDiff, a package of JavaBeans that lets users organize XML programming hierarchies.
- XML Productivity Kit for Java, which works with IBM's XML Parser for Java to build XML applications using Java.

Within a year, Phipps predicts, there will be a demand for the network to be able to send and receive data from customers and vendors formatted with XML. Right now, however, he admits these lofty goals have not been realized.

Emilie Schmidt, chief technology officer for the State of North Carolina, sees XML as a possible way to simplify the task of coordinating data among 23 diverse state agencies, such as the corrections department and the CAD/CAM group. The state is going to be an early adopter of Interleaf's BladeRunner XML Publisher, which lets you publish XML-tagged content onto CD-ROMs, which can then be updated over the Internet.

While she sees potential for XML as a way to electronically exchange data, she says wonders how easy it's going to be to ensure the tags are readable by everyone. "If everybody is inventing their own tags the same way that we let programmers invent their own variable names, we're not going to be able to match things," she says.

The development tools are available for free at www.alphaworks.ibm.com. The new XML Web site is at www.ibm.com/xml. ■

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## IBM's new XML offerings

**What XML means to you:**
In less than a year, IBM predicts your customers and vendors will start asking to receive information formatted with XML. The types of applications include:

- Accounting documents
- Purchase orders
- Bank drafts

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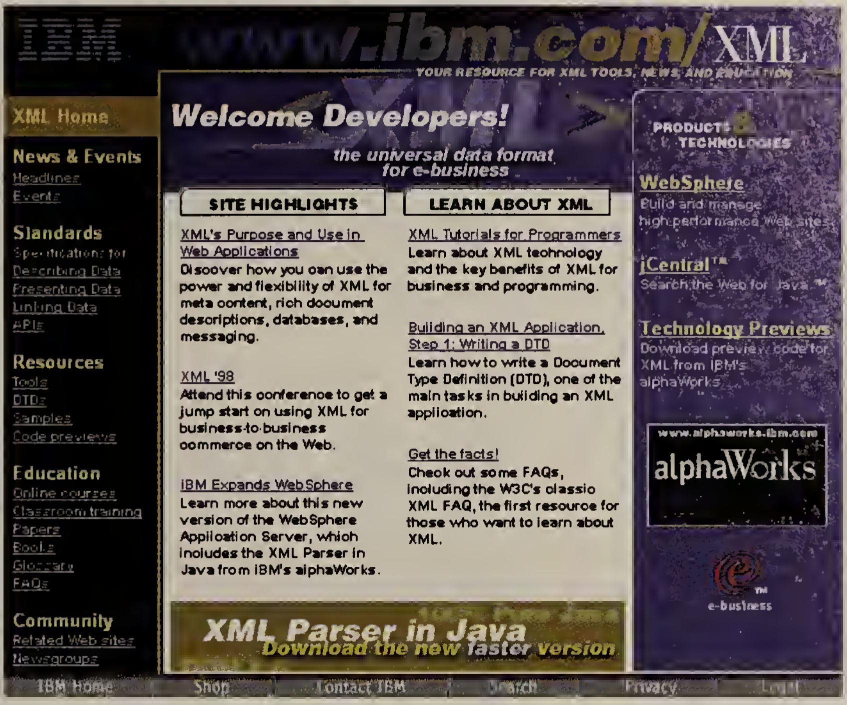

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**IBM hopes its new Web site** *will help developers learn XML ropes and keep up with XML happenings.*

# Windows terminal prices drop again

**By John Cox**

Boundless Technologies this week will unveil a $399 Windows-based terminal (WBT), the latest indication that prices for such devices are dropping like a barometer reading in the face of a force 5 hurricane.

The company's new terminal, dubbed Capio, is priced about $100 less than most other WBTs, which are thin clients designed to display applications running on servers outfitted with a multiuser version of Windows NT. The $399 price tag is more in line with the pricing Microsoft has for the past 18 months been quietly urging terminal vendors to adopt for their devices.

Capio, which will be unveiled at Comdex, uses the powerful and relatively inexpensive Cyrix 180-MHz MediaGX processor, features 10/100Base-T connections, and, like all "pure" WBTs, runs a special version of Windows CE. Boundless is also offering a 10-year warranty for an extra $99.

Boundless representatives say the addition of the powerful Cyrix processor is key, even though WBTs are simply displaying applications loaded on servers running Windows NT Server 4.0 Terminal Server Edition or Citrix Systems' WinFrame. The additional power is needed to handle Microsoft's Remote Desktop Protocol and Citrix's Independent Computing Architecture protocols, as well as to process sound and video applications, says Michael Oliva, Boundless' director of marketing. In addition, Windows CE is a 32-bit operating system that requires a large amount of processing power to execute optimally.

The inexpensive Cyrix chip is a big reason why Boundless can offer Capio for $399 and still claim excellent display performance.

Intel has only recently begun to find WBT vendors willing to adopt its chips, which are typically more expensive than others. Last week, for example, Network Computing Devices (NCD) of Mountain View, Calif., became the first vendor to introduce a WBT that conforms to the Intel Architecture Lean Client Guidelines, and uses the 133-MHz Intel Pentium processor.

The new terminal, called NCD ThinStar 300, also makes use of management products and technologies that are part of Intel's Wired for Management program.

ThinStar 300, like Boundless' Capio, uses Windows CE and has 10/100Base-T interfaces. NCD also added support for dial-up modem connections and configuration password protection. In addition, NCD offers its ThinStar Management Service software, which can be used to remotely manage and change the terminal's operating system software.

NCD's suggested retail price for its new terminal, with 16M bytes of RAM, is $799.

© Boundless: (800) 231-5445; NCD: (650) 694-0650

COMDEX fall '98

# NCI strikes deal with Fujitsu

Network Computer, Inc. last week announced that Fujitsu has licensed NCI's software for an upcoming line of network computers aimed at the corporate market.

The deal with the Japanese company is a major step for NCI, which is now re-attacking the corporate market after a temporary retreat, during which top executives evaluated a variety of market opportunities. Further details about Fujitsu's planned network computers were not available.

According to NCI, Fujitsu's Fuji Electronics group is already implementing early versions of the thin clients in conjunction with bar-code readers and other peripherals on its factory shop floors.

Also last week, NCI said two current customers, IBM and Tektronix, have decided to license the latest version of NCI's NC Navigator software. The package includes a Web browser based on Netscape Communicator 4.0, a Java virtual machine, a clutch of terminal emulators and a Java client for accessing applications on multiuser Windows NT servers.

IBM and Tektronix have been using versions of the NCI software since early 1997.

*—John Cox*

# AT&T Concert rolls out first global one-stop-shopping network services

*Set for confrontation with new MCI WorldCom services when existing user contracts expire.*

**By David Rohde**
*Basking Ridge, N.J.*

Striking while the iron is hot, AT&T last week announced its first joint services with Concert, a global venture owned by AT&T's new international partner, British Telecommunications (BT).

The move gives AT&T customers new options to connect their domestic voice and data networks to foreign locations. The services come two months after AT&T and BT signed a partnership agreement.

The six new services all carry the "AT&T Concert" name, with AT&T being the U.S. distributor and ongoing single point of contact. For example, the AT&T Concert Frame Relay Service would let customers sign a single-contract for frame service in 40 countries, starting now.

A related service, the AT&T Concert ATM Service, will be available in the second quarter of 1999. The other offerings involve IP and voice services (see graphic), and also have start dates in the first or second quarters of next year.

### International turmoil

AT&T's announcement comes at a time of remarkable upheaval in international alliances. And for users who already have services from one or more global ventures, the new offerings certainly complicate matters.

AT&T archrival MCI WorldCom, for instance, is also currently a distributor of Concert services in the U.S. MCI once had an equity interest in Concert, but sold it to BT around the time MCI merged with WorldCom last summer.

And some AT&T customers have global contracts with Concert competitor WorldPartners Co., an alliance of various national carriers assembled several years ago by AT&T.

AT&T and MCI WorldCom officials last week danced around the issue of how users' long-term international contracts would shake out.

For example, Joe Lueckenhoff, AT&T's data services vice president, noted that the AT&T domestic frame relay network and the Concert frame relay network happen to be based on Cisco Stratacom BPX switches at the core.

To provide seamlessness, AT&T has constructed multiple network-to-network interfaces (NNI) between the two networks. This would avoid a single point of failure, Lueckenhoff said.

Officials of AT&T and Concert have worked feverishly over the past 65 days to standardize service definitions such as circuit speeds and port subscription policies, as well as back-office procedures, he added.

### Pick a partner

AT&T customers who have WorldPartners contracts will be free to migrate to AT&T Concert services, Lueckenhoff said, though they will have to sign a new term contract to do so.

And MCI's Concert customers? "They'll have to make a call. It's fairly clear that those two platforms [MCI's and Concert's] are going to diverge," Lueckenhoff said, referring to MCI WorldCom's apparent plans to move away from its current frame relay switches to a new Ascend Communications platform (*NW,* Nov. 9, page 1).

MCI WorldCom spokesman John Houser counters that his company's customers will have a variety of choices once their Concert contracts end, since MCI WorldCom is building a portfolio of new international offerings under the On Net brand representing global end-to-end facilities.

Already, MCI WorldCom's own Global ATM service serves 13 countries, while the AT&T Concert ATM offering isn't available yet, Houser notes.

And the fact that new contracts take several months to negotiate works in MCI WorldCom's favor, he says: "By the middle of next year, we'll have the same [international] reach as Concert."

### Opposition delighted

Officials with international carriers that were not built by alliances are only too happy to stoke the uncertainty.

"This is the second version of Concert," says a spokesman for Equant Network Services, a global provider of frame, IP and voice services over its fully owned global network. "You have to wonder how stable these alliances are going to be in the future." ■

### I'll take half a dozen

**AT&T and Concert will offer six initial services.**

- ☑ Frame relay
- ☑ ATM
- ☑ Dedicated Internet access
- ☑ Remote LAN dial
- ☑ Voice virtual networks
- ☑ Inbound toll-free voice

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# Novell

*Continued from page 1*

tomers through Novonyx. That joint venture was folded back into Novell earlier this year.

"We think that NDS is a natural fit as the directory for the Internet," says Tracy Thayne, a Novell product manager.

By taking advantage of NetWare, and particularly NDS technologies, Liberty will provide ISPs with a level of manageability, performance and scalability not found in current standards-based messaging servers, Thayne claims. Also included in Liberty will be the ability to provide customized messaging applications, e-mail advertising insertions and Web mail, which are becoming more important to ISPs and their customers.

"I don't know why we haven't gone into this space with more gusto, but I think Novell is realizing we do have a lot of solutions that are of interest to the ISP community," Thayne adds.

### There are skeptics

Potential Liberty customers and industry experts, however, have mixed feelings regarding Novell's chances to penetrate a market in which the company has little experience and no established reputation. In fact, one observer suggested that Novell would do better to "stick to its knitting."

The Liberty server, according to Novell, will run only on NetWare at first, with support for Solaris and other Unix brands planned once NDS is ported to those operating systems. Liberty will support a host of Internet standards, including Post Office Protocol, Internet Mail Access Protocol, Simple Mail Transfer Protocol, Secure Socket Layers and Multipurpose Internet Mail Extensions. Liberty is separate from Novell's GroupWise messaging software for corporate customers.

### Angling for ISPs

**Among the competitors Novell's planned Liberty mail product will face are:**

- Software.com's InterMail
- Netscape's SuiteSpot Hosting Edition
- Sun's Internet Mail Server
- Oracle's Internet Messaging
- Sendmail's Sendmail 8.9

Liberty will include new Web-based administration capabilities for network managers and end users. In addition, one tool will allow Liberty to handle multiple variations of a user's e-mail address, such as joe.smith@isp.com, jsmith@isp.com or joe_smith@isp.com.

Novell intends to release a first beta of Liberty next month and ship the product in April or May, according to Thayne. Price has yet to be determined.

Opinions differ as to whether Novell has identified a potentially lucrative new market or embarked on a fool's errand.

Mark Levitt, an analyst with International Data Corp. in Framingham, Mass., believes Novell "could make a big splash" with ISPs "if it can get the message across about its products."

"Having a standards-based e-mail server is critical, since e-mail is the second most important hosted application for ISPs, second only to providing Web access to customers," Levitt says.

Although unlikely to use Liberty in his own Unix-based shop, one ISP official says he believes Novell might find some success in this side of the messaging market.

"If it's a good mail server, it'll find a niche, but a fairly small one," says Peter Seebach, president of Plethora Internet, a St. Paul, Minn.-based ISP. "Too many people are already running something else and Novell will have a hard time reinventing itself as an Internet company."

### Spread too thin?

Another industry analyst, Eric Brown of Forrester Research in Cambridge, Mass., believes Novell may have a shot in what he describes as "a growing market," but he questions the wisdom of even trying.

"It's most important right now for Novell to stick to its knitting," says Brown. "Do they really have the resources, the marketing bandwidth and the time to be chasing mail servers?"

One Novell customer, however, sees wisdom in the company's new direction.

"I think it's smart, to tell you the truth," says Travis Berkley, supervisor of LAN support services at the University of Kansas. "What does e-mail boil down to? File input/output. Who does file input/output fast? Novell." ■

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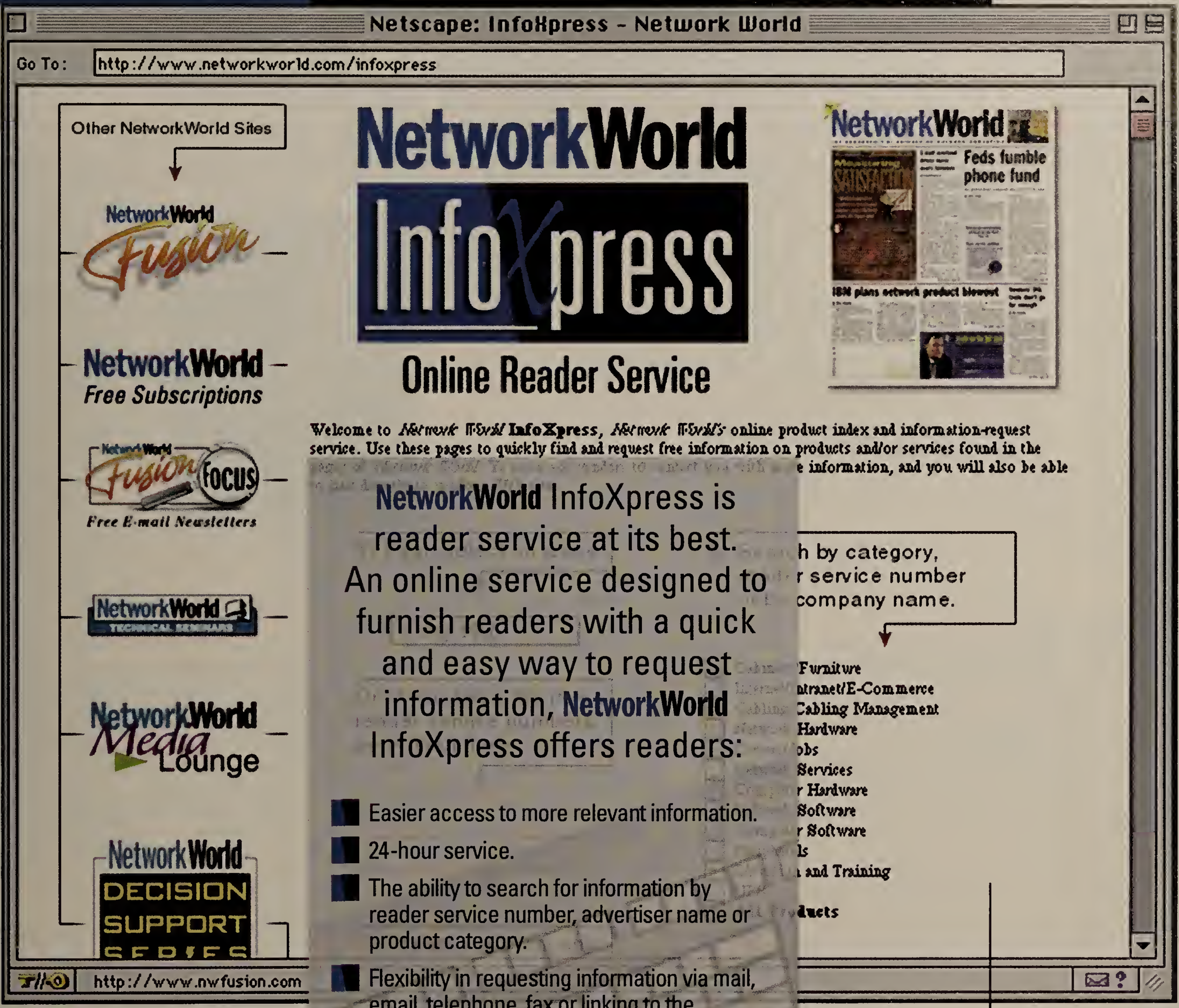
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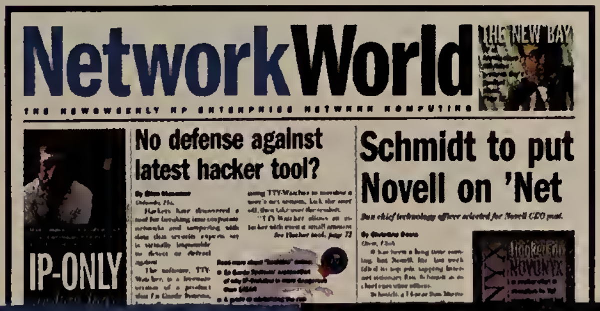
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## Hackers

*Continued from page 1*

"I spend 50% of my time baby-sitting these machines," laments Berrios. As a former hacker, Berrios still has a few hacker friends.

"They're doing it for the sheer thrill of exploring," he notes. "Now that I'm on this side of the fence, it makes me edgy. I know the reality of it. Nothing is 100% secure. Everything is simply an obstacle, and their exploits are changing so rapidly that you have to keep putting up new obstacles."

If a hacker manages to get past one obstacle, say by breaching ActionWorld's public Web server, he's usually stopped in what's popularly called the "demilitarized zone" between firewalls. When that happens, Berrios will try to track down the would-be intruder with the help of an ISP.

"One time it was a 13-year-old kid, and we called him and talked to him just to scare him a little," Berrios says.

### A HACKER'S TOOLBOX

**Here's a sampling of what hackers use to break into your networks.**

**L0phtcrack**
- Cracks passwords using brute-force attack methods.

**Nmap 2.0 or Queso**

- Performs a TCP fingerprint scan of the target system's IP stack.
- Provides an educated guess of the target network's operating system.

**DumpACL**
- With only a null session connection, DumpACL can enumerate a user's access control lists.

**Pwdump, netcat and BackOrifice**
- These "trojan horses" are placed behind the firewall and can "shovel" the shell program back to the trojan listeners.

SOURCE ERNST & YOUNG, NEW YORK

Far more nerve-racking are encounters with hard-core hackers out for criminal gain. A similar situation happened a year ago when someone broke in through ActionWorld's Microsoft Remote Access Server — apparently because the preconfigured "guest account" setting shipped with the server hadn't been disabled by ActionWorld's staff.

This criminally minded hacker exploited the vulnerability to gain access to ActionWorld's resources, and from there, he staged attacks on other organizations, accessed pornography sites and dealt in stolen credit cards.

This little crime wave got the New York City Police Department and the Federal Bureau of Investigation involved — and these agencies initially seized on ActionWorld as the suspect. After some explaining, the online gaming firm spent a month working with law enforcement officials to collect data on the hacker's activities so they could nab him. But in the end, the hacker eluded them. "This was a sophisticated break-in," Berrios says. "This person was very good at it."

Berrios says he knows from direct experience that hard-core criminals are on the rise in the hacker community, which traditionally has preferred to view itself as a bunch of adventurous free spirits out to have fun.

In fact, hackers are now getting paid to try to steal proprietary corporate data or military secrets, some claim. "Most hackers are kids, but there are professional hackers, the experienced ones. They're going where the money is," Berrios says.

### Universities exposed

No organization, not even a school as technically savvy as the Massachusetts Institute of Technology, is immune from the hacker menace. "We're working with the FBI right now to try to catch a hacker," says Jeff Schiller, network manager at MIT, where a troublemaker has been looking at password-protected student files stored on servers at the university.

Stopping hackers is particularly hard in a university setting such as MIT, where students balk at anything that restricts user access to the Internet.

"It's impossible to establish a security policy," concedes Schiller, who says MIT doesn't use a firewall for student access to the dormitory LANs because the school's technical culture rejects these types of controls.

Schiller berates hackers as "idiots" who bring down servers as they stumble around from machine to machine.

MIT is hardly the first university to have to cope with hackers. Universities have long been exploited as hacker proving grounds. Stanford University earlier this month disclosed that stolen passwords "sniffed" by hackers — apparently based in Sweden and Canada — gave the intruders access to 4,500 e-mail accounts.

### Hitting close to home

Sometimes hackers are more than just idiots; they're terrorists. That's according to Seminole, Fla., security consultant Winn Schwartau, who says hackers are now e-mailing death threats to him, his family, his staff and even his neighbors. "Extortion, murder and kidnapping threats," is how Schwartau describes the message content.

Why? Perhaps because Schwartau has been vocal against hacker exploits, speaking out at conferences, such as DefCon, where hackers anonymously intermingle with law enforcement officials.

During the past month, Schwartau has also started hosting a Microsoft-sponsored Internet radio program, airing daily at noon, on which he interviews hackers on www.thecyberstation.com.

Hackers, Schwartau says, have now managed to shut down his phone and electricity by fooling the utilities and have also pulled stunts such as ordering hundreds of WebTV boxes to be sent to his house, purchased with other people's credit cards.

But according to Schwartau, the FBI isn't paying attention to his plight.

"That's because the FBI agents are convinced that I'm a hacker," Schwartau says, perhaps because he has been hobnobbing with hackers lately.

### Global reach

Other stories suggest the strange lengths to which corporations will go to to shut out hackers.

"I've had hackers bold enough to e-mail us while they were hacking the system, telling us there was nothing we could do to keep them out," recounts Hewlett-Packard information security consultant Don Pipkin, author of *Halting the Hacker*, published by Prentice Hall.

**MIT's Jeff Schiller** *is working with the FBI to catch a hacker.*

Pipkin tells of an incident in which a hacker broke into the intranet of a major telecommunications company, which he declined to name, through the company's public Web server. HP's security division, called in to stop the intruder, closed up some of the security holes in the server and managed to trace the attacker to Pakistan.

Because nabbing this hacker seemed somewhat futile, HP asked the telecom firm how important it was to let the nation of Pakistan view its public Web server. With the answer being "not very," the telecom firm quietly cut off that entire country's access to its Web server.

### Beyond the 'Net

The Internet, though, isn't the only medium that hackers can use to grab control of your network resources. Ed Simonson, president of TeleDesign management, a Burlingame, Calif., consultancy that conducts security audits, has witnessed some dazzling hacker exploits over the years.

Hackers are known to call corporate switchboards and demand to be transferred to "918," which gets them outside access to a long-distance line. "They'll also dial in to your voice mail and try to dial another extension," Simonson says.

Hackers also like to dial in to the maintenance ports of Rolm, Nortel Networks and Lucent PBXs that are used by service repairman. So it's important to ensure that a company using PBXs has installed third-party security software for the maintenance port. Such software is available from Microframe, Lima and other vendors, Simonson says.

"I have been in a PBX and seen two different hacks — two thefts — going on at the same time. Neither knew the other was there," Simonson recounts. "Hackers may never make more than two calls per day on your system, so you have to have a policy in place to review phone logs," he says.

If a hacker strikes, who has to pay the price? "The law says whoever controls the access, pays the bill," Simonson says. "For the most part, with a Centrex line, you're not responsible for paying the bill." ■

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## Flat-rate

*Continued from page 1*

telephone exchange.

But now those rates, which can easily top $600 per month, are being discarded for some lucky customers in contract negotiations.

"I just did a deal for flat-rate access for $325 per T-1," says David Bower, president of inTelesystems, a Dallas consulting firm specializing in negotiating telecom contracts.

The deal with AT&T came after Bower's client agreed to put AT&T voice and data services on the same T-1 lines at offices throughout the country.

Likewise, Reynolds Metals several months ago got a flat T-1 access deal from AT&T for about 80 of its locations nationwide as part of a contract overhaul, says Debbie Shashaty, lead communications consultant for the Richmond, Va., maker of Reynolds Wrap and other consumer and industrial products.

"I wouldn't be surprised if you saw more and more of this sort of thing," Shashaty says.

Still others are enjoying a variation on the new negotiated plans: tiered flat rates for T-1s and other access speeds. MBNA Bank in Wilmington, Del., has a deal with AT&T for one access price for T-1s, another for T-3s and so on for intermediate speeds, says Kelsey Hill, executive vice president of telecommunications and network services for the bank's IT subsidiary.

### The urge to converge

For the carriers, the motivation for the new plans is simple: to get customers to install T-1 access to their POPs in as many branch offices as possible before regional Bell operating companies, competitive local exchange carriers (CLECs) and new long-distance carriers lop off part of a user's voice or data traffic.

Many branch offices that can't typically justify dedicated access for one major-carrier service can do so if they put long-distance voice, legacy data, Internet and potentially local phone calls on the same pipe, explains Hank Levine, a partner at the Levine, Blaszak, Block & Boothbay law firm in Washington, D.C., who negotiates user contracts with carriers.

"In exchange for discounting the access, the carriers are getting exclusivity with the customer," he says.

Dedicated-access prices literally are all over the map, with smaller cities running $700 or more, and even a difference of $250 or more per month between a city and its suburbs (see map).

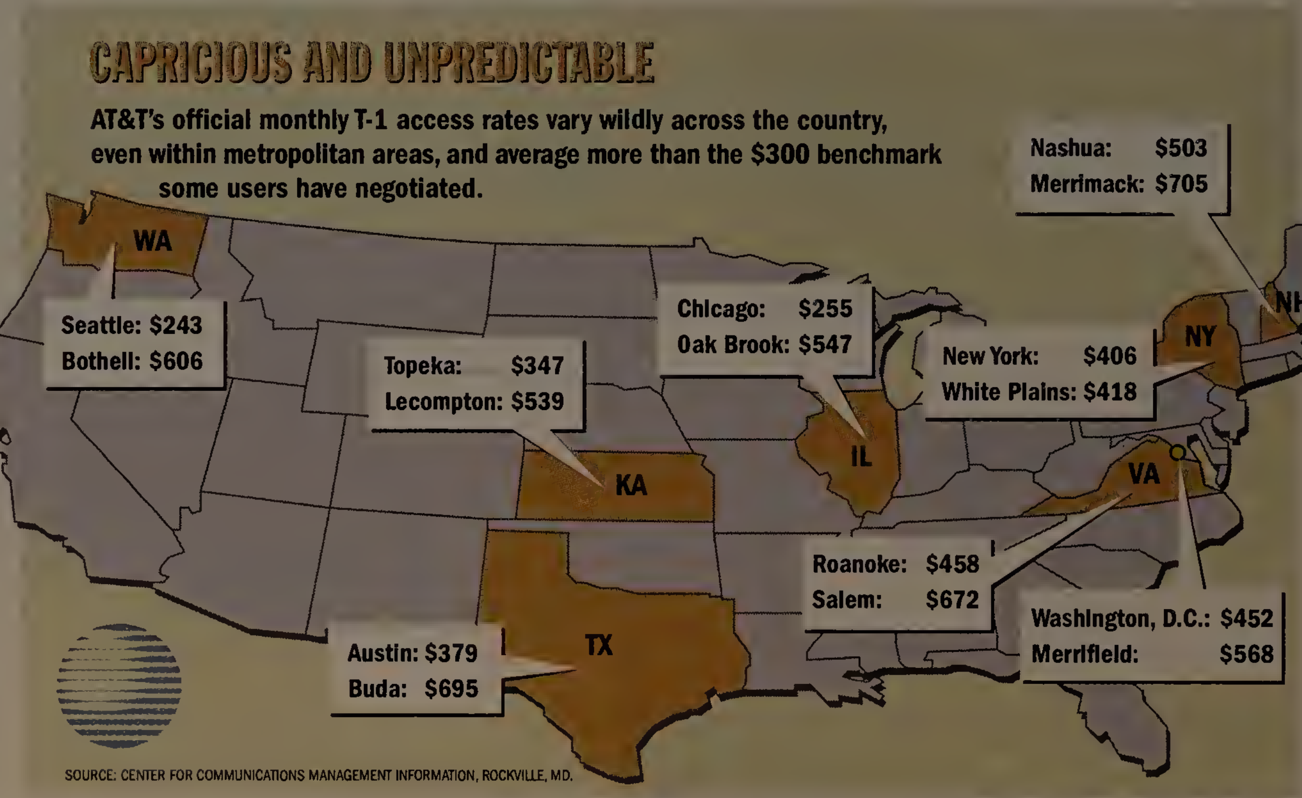
But with flat-rate plans, "$300 is the kind of number that's getting thrown out there," Levine says.

The trend is accelerating now that AT&T and MCI WorldCom each own numerous CLEC city networks. "Now that these guys own MFS [Communications] and Teleport, their own cost is as low as $150 per T-1," Levine says.

Carrier officials confirm that this form of convergence — where at least the local piece of multiservice traffic, if not the actual long-distance transport, is carried over the same network — is driving the deals.

"We do like to have dedicated access into our customer locations," says Steve Sobolevitch, AT&T's strategic pricing manager for high-speed services. "It gives us the opportunity to sell our entire portfolio of our products."

AT&T quietly began making the flat-rate offers about a year ago because "some of our users found that it is an easy way for them to purchase the service," Sobolevitch says.



**CAPRICIOUS AND UNPREDICTABLE**

**AT&T's official monthly T-1 access rates vary wildly across the country, even within metropolitan areas, and average more than the $300 benchmark some users have negotiated.**

SOURCE: CENTER FOR COMMUNICATIONS MANAGEMENT INFORMATION, ROCKVILLE, MD.

MCI WorldCom will provide a regional or national flat T-1 access rate on a case-by-case basis "for an order that is a significant size," says a company spokesman.

> *"In exchange for discounting the access, the carriers are getting exclusivity with the customer."*
>
> **Hank Levine,** partner at Washington, D.C. law firm Levine, Blaszak, Block & Boothby

In particular, MCI WorldCom is providing this incentive for users choosing its On-Net service, which groups voice, data and Internet traffic into a service bundle over MCI WorldCom-owned end-to-end facilities.

A Sprint spokeswoman would say only that the company has unspecified promotions at various times, but rivals say Sprint is making some flat-rate offers as well.

### Avoiding the trap

Discount or not, some users simply don't need T-1 capacity.

For example, retailer Pier One Imports maintains T-1 access to AT&T only at nine zone offices and distribution sites, leaving the chain's 750 stores with dial-up access, says Stan Miller, Pier One's manager of production network services in Fort Worth, Texas.

For his planned AT&T frame relay network, Miller says he'll install standard 64K bit/sec access lines dedicated solely to connecting 750 Pier One stores with AT&T's basic 56/64K frame relay ports, rather than purchasing T-1s for multiple voice and data services.

"Once you get past 56/64K access lines, you have to get a full T-1," Miller says. "And whatever the cost delta is, even if it's only $30 or $40 per month, I have to multiply that by 750, and that's a staggering amount."

AT&T's flat-rate gambit appears to be closely tied to its recent moves that raised the price of basic 56K bit/sec frame relay service but helped users by reducing prices for higher speed frame relay connections (*NW,* Nov. 9, page 33).

For example, Reynolds Metals' flat-rate T-1s will be partially needed to support 128K bit/sec frame relay ports at most sites throughout the corporate network, Shashaty says.

The move is also part of a commitment by AT&T Chairman and CEO C. Michael Armstrong to begin simplifying user contracts while at the same time branching out into corporate IP services.

At a private June meeting of the Enterprise Networking Technologies Users Association, an AT&T user group, Armstrong conceded that "we've got to be simpler in our contracts" while "offering all of the services that you need."

And some users who currently give their branches only switched access are, indeed, champing at the opportunity to trade up to dedicated access — if they can grab the new deals.

Specialized corporate lender Congress Financial has maintained dedicated access only at its New York headquarters, using MCI WorldCom dial-up service at nine U.S. branch locations, says Andrew Stratford, the firm's vice president of telecommunications.

But after Stratford told his sales representatives he's considering installing 384K bit/sec videoconferencing at all the sites, the representative told him a standard flat-rate T-1 offer may be on the table next year for users his size.

"Sooner or later he says there's going to be a standard flat-rate offer and you'll be able to use as much as you want," Stratford says.

### Read before you sign

Naturally, no deal is perfectly simple in the telecom world, and experts note a few caveats in the flat-rate T-1 access trend.

First, carriers generally apply the rate to 80% to 90% of the country, excluding really isolated areas, Levine says. Many of those areas are exclusively served by small, independent telephone companies. Those telcos often have out-of-whack, private-line pricing that no long-distance carrier can sufficiently discount to bring into the flat-rate deal, Levine explains.

Second, the offer may not be available to customers located an unusual distance from the carrier POP, says AT&T's Sobolevitch.

Finally, even the official variable price lists come with standard 20% volume discounts that can sometimes be bumped as high as 40% in negotiations.

So be sure the flat rate gives you at least that much in savings over the official tariffed prices, Levine says. ■

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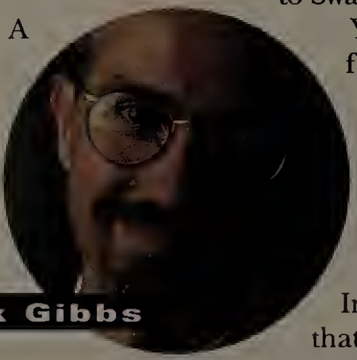
## Backspin

# Internet Time: Old wine, new bottles

*"Internet Time is absolute time for everybody. Now is now and the same time for all people and places. Later is the same subsequent period for everybody. The numbers are the same for all."*

— Nicholas Negroponte on Swatch's Web site (www.swatch.com/internettime)



Mark Gibbs

Hmm, what's this? A new spin on a hackneyed term? "Internet time" used to refer to the accelerated schedule in which events, and particularly product development, happened today (pegged at four Internet years for every real year).

But now we have Mr. Negroponte's version.

If you just skimmed the quote, might I suggest you take a second to reread it. You need to get the true flavor of Negroponte's statement — the real depth, the full monty.

Got it? No? Well neither did I. What a load of crap.

In case you haven't heard of Negroponte, he's the founder and director of the famous Massachusetts Institute of Technology's Media Laboratory. He is also a high-tech celebrity, author of the book *Being Digital* (an occasionally insightful but fundamentally pop collection of sound bites) and now, apparently, a shill for Swatch.

Swatch, the watchmaker famous for its amazing marketing success with its eponymous brand of consumer timepieces, is promoting its new ".beat" range of watches. And what its .beat marketing plan apparently attempts to do is jump on the Internet bandwagon.

Swatch wants us to replace Greenwich Mean Time with the meridian that passes through its headquarters in Biel, Switzerland, and rename it Biel Mean Time (BMT). What is as remarkable as their hubris is the proposal's sheer silliness.

Swatch proposes to split the day up into one thousand "beats" (that makes each beat one minute 24.6 seconds long) with the day starting at 00:00 BMT. So 3 a.m. East Coast time becomes @375 Swatch time (the "@" is their abbreviation for beats . . . of course, the fact that this symbol is already in rather wide use is irrelevant to Swatch).

You still have to convert from BMT to whatever time zone you're in. But needless to say, all of the .beat watches do this conversion for you.

Here at the Gibbs Institute we reckoned that if Swatch can make a play for its own meridian, we too can define our own time system. We plan to call this Ventura Mean Time, which we will refer to as VMT.

Now VMT's basic unit of temporal duration will be the femtosecond (that's 0.00000000000000001 of a second, the shortest event man has been able to create).

We selected our zero point to be the year 2000. Thus, 3 a.m. East Coast time on November 20, 1998, is -407,500,000,000,000,000 VMT (VMT goes positive after midnight, Dec. 30, 1999).

And to translate VMT to your local time you simply multiply your time zone difference in hours from VMT by ten to the power of fifteen, add to VMT, divide by ten to the fifteen, subtract the result from 00:00 on January 1, 2000 VMT (that's zero if you got lost) and voila! You have the time. Simple, eh?

The screaming need for this redefinition we'll leave to Mr. Negroponte: *"Cyberspace has no seasons. The virtual world is absent of night and day. Internet Time is not driven by the sun's position, it is driven by yours — your location in space and time."*

Whatever, Nick.

*If you've got the money, I've got the time at nwcolumn@gibbs.com or on (800) 622-1108, Ext. 7504.*

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# 'NET BUZZ

### The latest on the Internet/Intranet Industry

**REALLY THINKING OUTSIDE THE BOX** I first met **Joe Firmage** two years ago when he was on one of the initial promotional tours for his Internet services start-up **USWeb.** He was 26 and had already been an executive at **Novell,** which in 1993 bought Firmage's first software start-up, **Serius,** for $24 million.

Because Firmage was young and successful, naturally I was thoroughly prepared to dislike him. But the guy who came in to visit me was not only intelligent and ambitious, he was entirely unassuming and polite. I enjoyed Firmage's 30-minute stay. (All right, as much as you can enjoy any vendor pitch.)

While Firmage's intelligence and knowledge of the industry were obvious, I also detected a curious level of detachment, which I attributed to the fatigue and boredom inevitable in any press tour.

Now I realize the reason: Firmage was pondering bigger questions than which boutique 'Net services company the acquisitive USWeb should buy next.

If you haven't heard, USWeb's board of directors abruptly ousted Firmage as CEO earlier this month after it became public that he was involved in an outside research project exploring such issues as religion, science, time travel and altering gravity.

Chris Nerney

The board did the right thing: Its job is to protect the interests of investors, and USWeb is in the final stages of a merger announced in September with marketing communications firm **CKS Group,** a deal that will result in a new company called **Reinvent Communications.**

And when your 28-year-old CEO is linked to a book and organization with references to **L. Ron Hubbard, The X Files** and cultish millennialism, well, that's a dubious value-add to the customer who just wants an extranet for his supply channel.

All parties involved deny the naming of veteran **Oracle executive Robert Shaw** as USWeb CEO was triggered by the gossip and stories surrounding Firmage's pending book and his **Kairos** research project.

To make room for Shaw, Firmage was named "chief strategist" for USWeb/Reinvent and will retain his board seat. I suspect, though, he will gradually fade away as his 51-year-old successor settles in and the merged company begins doing business.

In the meantime, Firmage plans to unveil a 400-page book on Nov. 25 at a Web site called Kairos, which can be found at **www.thewordistruth.org.** (Don't worry, the URL makes me cringe too.)

Kairos is ancient Greek for "the right moment," and the site teases visitors with "clues" to "profound new insights into our past and future."

Most clues are in the form of recommended books such as *The Ecology of Eden* by **Evan Eisenberg** and *Cosmos* by **Carl Sagan** and with convenient links to Amazon.com, proving even a trek of the metaphysical requires good electronic commerce software.

As for Firmage's own book, the Web site promises that "on [Nov. 25], at this place, the religion of our past and the science of our future will come together, as one vision of the Truth." Wow, and I would have settled for a book signing at **Barnes & Noble.**

To be sure, this whole Kairos thing could turn into a huge embarrassment for Firmage. Still, the guy clearly is a searcher of higher meaning, which I respect, with the courage to put what he believes out there for the whole world to see (www.meaningoflife.com/Firmage.html), which I also respect.

Now if he can only get venture capital for this gig.

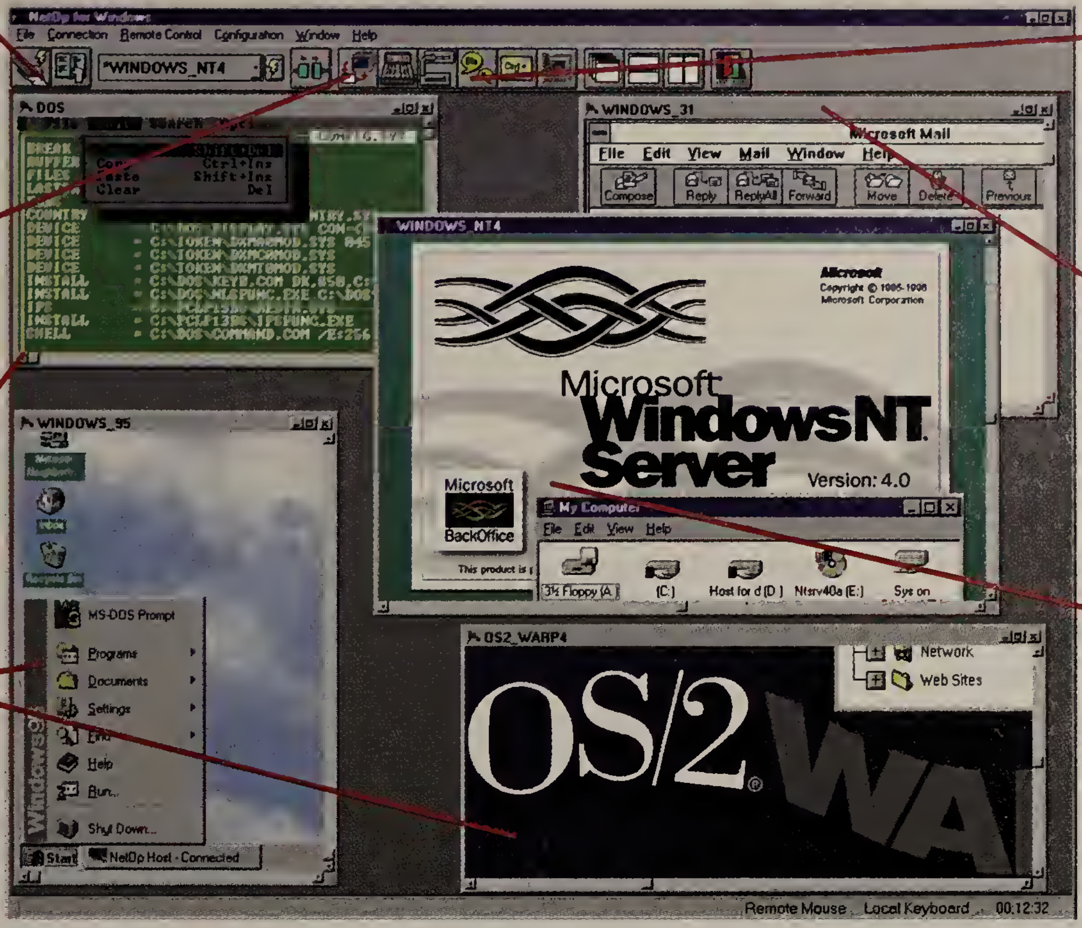
*Joe, once these columns are posted online, they can float around cyberspace for years, so please don't pull a Hale-Bopp on me. Readers, if you stumble upon any good Internet- and intranet-related news, rumors or theorems, enlighten me at (508) 820-7451 or cnerney@nww.com.*

*The browse function presents a list of NetOp Host PCs in the network.*

*View controlled PCs windowed — or zoom in for a full screen view.*

*Backwards compatible. Can remote control earlier NetOp Host versions on your network.*

*Simultaneous remote control of multiple PCs running any resolution and color depth.*



NetOp for Windows
File Connection Remote Control Configuration Window Help
WINDOWS_NT4
DOS
WINDOWS_31
Microsoft Mail
File Edit View Mail Window Help
Compose Reply ReplyAll Forward Move Delete Previous
WINDOWS_NT4
Microsoft Windows NT Server Version: 4.0
Microsoft BackOffice
My Computer
File Edit View Help
3½ Floppy (A:) (C:) Host for d (D:) Ntsrv40a (E:) Sys on
WINDOWS_95
MS-DOS Prompt
Programs
Documents
Settings
Find
Help
Run...
Shut Down...
Start
NetOp Host - Connected
OS2_WARP4
Network
Web Sites
OS/2 WARP
Remote Mouse Local Keyboard 00:12:32

*Chat feature allows on-line conversation with remote user — ideal for support situations.*

*Remote control using any popular communication standard (NetBIOS, IPX, TCP/IP, modem and ISDN).*

*Cross platform. All major PC operating systems are supported.*

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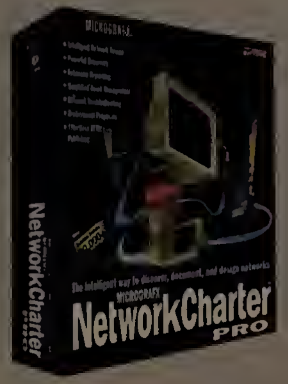
# PIECE TOGETHER YOUR COMPANY'S NETWORK BASED ON WHAT? PICTURES?



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